

Gas Chromatography

1. REVIEWS AND BOOKS

- 1 Gilbert, S.G.: Applications of IGC for research in kinetic and thermodynamic problems in food science. *Dev. Food Sci.*, 33 (1993) 1071-1079; C.A., 121 (1994) 33356r - a review with 30 refs.
- 2 Kuznetsova, E.E. and Dolgushina, G.S.: (Gas-liquid chromatography in clinical medicine (review of literature).) *Klin. Lab. Diagn.*, 6 (1993) 4-7; C.A., 121 (1994) 4181z - a review with 40 refs.
- 3 Modeste, F. and Caude, M.: (LC-GC online coupling. Principles, developments and applications.) *Analisis*, 22 (1994) 89-107; C.A., 121 (1994) 72704x - a review with 109 refs.
- 4 Moskvin, L.N. and Rodinkov, O.V.: Analytical application of liquid-gas and liquid-gas-solid chromatography. *Crit. Rev. Anal. Chem.*, 24 (1994) 317-325; C.A., 121 (1994) 169266u - a review with 28 refs.
- 5 Overton, E.B. and Carney, K.R.: New horizons in gas chromatography: Field applications of microminiaturized gas chromatographic techniques. *TrAC*, 13 (1994) 252-257 - a review with 23 refs.

See also 21, 52, 107, 112, 129, 142, 150, 163, 169, 175, 190, 191, 193, 196, 217, 221, 438, 478, 490, 567, 647, 660, 662.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 6 Felinger, A.: Deconvolution of overlapping skewed peaks. *Anal. Chem.*, 66 (1994) 3066-3072.
- 7 Messadi, D., Ferchichi, L. and Nouar, L.: (Calculation of the dead time in gas chromatography.) *C. R. Acad. Sci., Ser. II: Mec., Phys., Chim., Astron.*, 318, No. 7 (1994) 901-904; C.A., 120 (1994) 338069u.
- 8 Meyer, V.R.: Generation and investigation of chromatographic peaks using a spreadsheet program. *LC-GC Int.*, 7 (1994) 590-596.
- 9 Wang Dongyuan, Sun Yunqing and Cai Hong: (Some problems of nonequilibrium plate theory.) *Chin. J. Chromatogr.*, 12 (1994) 247-248.
- 10 Woodbury, C.P., Jr.: A stochastic model of chromatography. *J. Chromatogr. Sci.*, 32 (1994) 339-348.
- 11 Zimmermann, H.J. and Meier, W.: (Fuzzy logic in analytical chemistry.) *GfT Fachz. Lab.*, 38 (1994) 502-505; C.A., 121 (1994) 72513j.

See also 172.

2b. Thermodynamics and theoretical relationships

- 12 Havelec, P. and Sevcík, J.G.K.: Concept of additivity for a non-polar solute-solvent criterion $\log L^{16}$. Non aromatic compounds. *J. Chromatogr. A*, 677 (1994) 319-329.
- 13 Li, P. and Xu, Z.: (A new equation of state with mixing rule from group contribution model - GC-MCSPT.) *Huagong Xue-bao*, 44 (1993) 298-308; C.A., 120 (1994) 326711j.
- 14 Meyer, E.F. and Feil, J.: Thermodynamics of adsorption of $C(CH_3)_4-nCl_n$ ($n=0-4$) on sterling FT graphite at zero coverage using gas-solid chromatography. *Langmuir*, 10 (1994) 2399-2402; C.A., 121 (1994) 66894t.
- 15 Naito, K., Okabe, T., Moriguchi, S. and Takei, S.: Mixed retention mechanism of gas-liquid chromatography of hydrocarbons and dialkyl ethers on tricresyl phosphate-coated silica gel column. *Anal. Sci.*, 10 (1994) 731-736.
- 16 Wasiaik, W.: Thermodynamic characterization of the specific interactions between alkenes and chromatographic packings with chemically bonded copper(II) complexes. *Chem. Anal. (Warsaw)*, 39 (1994) 325-333.
- 17 Wilson, D.I., Cordero, T., Gómez-Lahoz, C., Delgado, R.G. and Rodriguez-Maroto, J.M.: Soil cleanup by *in-situ* aeration. XX. Mass transport of volatile organics in wet activated carbon. *Sep. Sci. Technol.*, 29 (1994) 2073-2095.
- 18 Xu Guowang, Liang Xiwu, Yang Li, Zhang Xiangmin, Zhang Yukui and Lu Peichang: (Discussion about repelling interaction in gas chromatography.) *Chin. J. Chromatogr.*, 12 (1994) 310-312.

See also 118, 119, 185, 346.

2c. Relationship between structure and chromatographic behaviour

- 19 Gerbino, T.C. and Costello, G.: Prediction of programmed temperature retention times on linked capillary columns of different polarity. *J. High Resolut. Chromatogr.*, 17 (1994) 597-602.
- 20 Kollie, T.O.: Characterization of solute-solvent interactions in gas-liquid chromatography and the application of multivariate analysis to the classification of stationary phase selectivity. (Volumes I and II). Avail. *Univ. Microfilms Int.*, Order No. DA9310679, 1992, 728 pp.; C.A., 121 (1994) 92753r.
- 21 Peng, C.T.: Retrieval of structure information from retention index. *J. Chromatogr. A*, 678 (1994) 189-200 - a review with 50 refs.

See also 12, 16, 111, 120, 123, 165, 222, 236, 301, 346, 372.

2d. Measurement of physico-chemical and related values

- 22 Abdel-Azim, A.A.A.: Study by inverse gas chromatography of the interaction of polyisobutylene with various solvents. *Arabian. J. Sci. Eng.*, 18 (1993) 379-401; C.A., 121 (1994) 158586x.

- 23 Balard, H. and Papier, E.: Characterization and modification of fillers for paints and coatings. *Prog. Org. Coat.*, 22 (1993) 1-17; C.A., 121 (1994) 85767v.
- 24 Burness, J.H. and Dillard, J.G.: An investigation of the surface properties of anodized aluminum by inverse gas chromatography. *Langmuir*, 10 (1994) 1894-1897; C.A., 120 (1994) 331914g.
- 25 Chehimi, M.M. and Pigois-Landureau, E.: Determination of acid-base properties of solid materials by inverse gas chromatography at infinite dilution. A novel empirical method based on the dispersive contribution to the heat of vaporization of probes. *J. Mater. Chem.*, 4 (1994) 741-745; C.A., 121 (1994) 58427c.
- 26 Chen, H. and Wagner, J.: An efficient and reliable gas chromatographic method for measuring liquid-liquid mutual solubilities in alkylbenzene + water mixtures: Toluene + water from 303 to 373 K. *J. Chem. Eng. Data*, 39 (1994) 475-479; C.A., 121 (1994) 43987m.
- 27 Dossi, C., Fusi, A. and Psaro, R.: A combined mass spectrometric/gas chromatographic approach for the thermostatical characterization of supported heterogenous catalysts. *Thermochim. Acta*, 236 (1994) 165-173; C.A., 121 (1994) 43862s.
- 28 Genkin, A.N. and Petrova, N.A.: Reaction of CO with Rh(I) carbonyl complexes under the conditions of GLC. *Rhodium Express*, 3 (1994) 11-16; C.A., 121 (1994) 109216t.
- 29 Giamarchi, P., Fakirian, A., Chaouch, A.A., Pouliquen, I., Lessards, G., Sergent, M. and Phan, T.L.R.: (Dynamic head space system in experimental research methodology: use in analysis of ratio-induced hydrocarbons.) *Analisis*, 22 (1994) 127-134.
- 30 Jacob, P.N. and Berg, J.C.: Acid-base surface energy characterization of microcrystalline cellulose and two pulp fiber types using inverse gas chromatography. *Langmuir*, 10, No. 9 (1994) 3086-3093; C.A., 121 (1994) 159586j.
- 31 Jagiello, J., Bandosz, T.J. and Schwarz, J.A.: Study of carbon microstructure by using inverse gas chromatography. *Carbon*, 32 (1994) 687-691; C.A., 121 (1994) 142444p.
- 32 Koutek, B., Hoskovec, M., Vrkocová, P., Konecný, K. and Feltl, L.: Gas chromatographic determination of vapour pressures of pheromone-like compounds II. Alcohols. *J. Chromatogr. A*, 679 (1994) 307-317.
- 33 Kuang Yueping, He Nongyue, Shi Qihong and Gong Jian: (Study on acidity of ultrastable Y zeolites by frontal gas chromatography.) *Chin. J. Chromatogr.*, 12 (1994) 270-272.
- 34 Letcher, T.M., Bayles, J.W. and Moolian, W.C.: The determination of activity coefficients at infinite dilution using GLC with moderately volatile solvents (*cis*- and *trans*-decalin) at the temperature 298.15 K. *J. Chem. Thermodyn.*, 26 (1994) 571-576; C.A., 121 (1994) 19434h.
- 35 Liang, J., Drake, D. and Roselius, M.: Conformer analysis study of 1,2-diiodotetrafluoroethane by gas chromatography/Fourier transform infrared spectroscopy. *Appl. Spectrosc.*, 48 (1994) 206-208.
- 36 Lin, H.-Y.: Water sorption properties of corn meal extrudates: thermodynamic approach by the methods of inverse gas chromatography and water sorption isotherms. Avail. *Univ. Microfilms Int.*, Order No. DA9412659, 1993, 376 pp.; C.A., 121 (1994) 81442n.
- 37 Liu, Y., Chou, H.-C. and Stoffer, J.O.: Analysis of ultrasonically induced free radicals in the emulsion polymerization system by GC-MS. *J. Appl. Polym. Sci.*, 53 (1994) 247-254; C.A., 121 (1994) 58062e.
- 38 Liu, Y., Liu, L., Yun, K.S., Zhu, C., Yu, B. and Parcher, J.F.: Investigations of total adsorption in gas-solid systems by tracer pulse chromatography. *Anal. Chem.*, 66 (1994) 2852-2857.
- 39 Marinichev, A.N. and Stolyarov, B.V.: (Application of autoregression model in phosphoric-acid-catalyzed dehydration of 3-methyl-3-pentanol studied by reversed-flow gas chromatography.) *Zh. Obshch. Khim.*, 64 (1994) 101-106; C.A., 121 (1994) 82225f.
- 40 Mazzei, J.L., de Aquino Neto, F.R. and Monteiro, J.L.F.: Absorption processes of *n*-butenes in sulfuric acid. 1. Determination of di-sec-butyl sulfate, di-sec-butyl ether, and sec-butyl alcohol by high-resolution gas chromatography. *Ind. Eng. Chem. Res.*, 33 (1994) 1259-1263; C.A., 121 (1994) 98822j.
- 41 Monaghan, J.J. and Wagner, M.H.: Interconversion of chemical species during analysis by gas chromatography/mass spectrometry. *Rapid Commun. Mass. Spectrom.*, 8, No. 5 (1994) 432-434; C.A., 121 (1994) 148035c.
- 42 Murakami, Y.: Studies on interaction between inorganic material and polymer by inverse gas chromatography. *Polym. J. (Tokyo)*, 26 (1994) 607-612; C.A., 121 (1994) 10519g.
- 43 Nesterova, I.P. and Rekhter, B.A.: (Determining the rate of release of the synthetic sexual insect attractants from preparative form using vapor-phase gas-liquid chromatography.) *Agrokhimiya*, 4 (1994) 98-100; C.A., 121 (1994) 52333x.
- 44 Ryu, Y.H., Ri, U.M. and Ri, C.J.: (Study on the binding mode in absorbed molecules on the graphite surface.) *Choson Minjuju Inmin Konghwaguk Kwahagwon Tongbo*, 6 (1993) 31-33; C.A., 120 (1994) 331938t.
- 45 Tian, M. and Hunk, P.: Characterization of polymer-solvent interactions and their temperature dependence using inverse gas chromatography. *J. Chem. Eng. Data*, 39 (1994) 742-755.
- 46 Vidal, A., Wang, W. and Donnet, J.B.: Study of surface activity of carbon black by inverse gas chromatography. Part I. Evolution of the surface properties of carbon blacks upon extraction. *Kautsch. Gummi, Kunstst.*, 46 (1993) 770; C.A., 121 (1994) 159204h.
- 47 Wan-Badhi, W., Bloor, D.M. and Wyn-Jones, E.: The partitioning of *n*-hexanol into micelles of cetyltrimethylammonium bromide in aqueous solution. Ultrasonic relaxation and head-space analysis measurements. *Langmuir*, 10 (1994) 2219-2222; C.A., 121 (1994) 66339r.
- 48 Yang, Y., Xie, J. and Fu, Z.: (Study on water glass aging mechanism by using TMS-GC method.) *Tongji Daxue Xuebao*, 21 (1993) 555-560; C.A., 121 (1994) 41207h.

See also 160, 192, 458, 507, 554, 562, 565, 566.

3. GENERAL TECHNIQUES

3a. Apparatus and accessories

- 49 Annino, R.: Industrial-grade field-mountable gas chromatograph for process monitoring and control. *J. Chromatogr. A*, 678 (1994) 279-288.

- 50 Chen, C.: (Self-installed refinery gas analyzer and its application.) *Shiyou Lianzhi Yu Huagong*, 25, No. 2 (1994) 59-62; C.A., 121 (1994) 13467z.
- 51 David, P.A. and Pauls, R.E.: Applications of portable gas chromatography for air and water monitoring. *Process Control Qual.*, 5 (1993) 151-158; C.A., 121 (1994) 26020y.
- 52 Grob, K.: Injection techniques in capillary GC. *Anal. Chem.*, 66 (1994) 1009A-1019A - a review with 49 refs.
- 53 Hara, K., Ito, A., Akiyama, A. and Itani, T.: (A new portable gas chromatography system for continuous measurement of airborne organic solvents and its application to workplaces.) *Rodo Kagaku*, 70 (1994) 299-306; C.A., 121 (1994) 140382t.
- 54 Higdon, W.R.: Detachable column cartridge gas chromatograph. U.S. US 5,298,225 (Cl. 422-89; G01N30/54), 29 Mar. 1994, US Appl. 812, 532, 23 Dec. 1991, 10 pp.; C.A., 121 (1994) 26044j.
- 55 Hinshaw, J.V.: Very-large-volume injection. *LC-GC Int.*, 7 (1994) 560-563.
- 56 Mol, J.G.J. and Gerstel, E.: (Method for gas chromatographic separation of substances.) Ger. DE 4,316,375 (Cl. G01N30/16), 30 Jun. 1994, Appl. 15 May 1993; 5 pp.; C.A., 121 (1994) 147989e.
- 57 Mueller, F.: (Apparatus for gas chromatographic separation of components of a mixture.) Ger. Offen. DE 4,339,536 (Cl. G01N30/88), 01 Jun. 1994, DE Appl. 9,216,106, 26 Nov. 1992; 8 pp.; C.A., 121 (1994) 147963s.
- 58 Muto, H.: Setting up of backflush time in gas chromatography. *Jpn. Kokai Tokkyo Koho* JP 06,148,158 [94,148,158] (Cl. G01N30/40), 27 May 1994, Appl. 9/324,717, 11 Nov. 1992; 5 pp.; C.A., 121 (1994) 169342r.
- 59 Nishikawa, M. and Hayashi, Y.: Gas chromatograph using hydrogen as a carrier gas. *Jpn. Kokai Tokkyo Koho* JP 05,346,424 [93,346,424] (Cl. G01N30/54), 27 Dec. 1993, Appl. 9/2/178,979, 12 Jun. 1992; 4 pp.; C.A., 121 (1994) 258541m.
- 60 Oohinata, H., Inoe, N. and Yonei, Y.: An effluent fraction collector for SFC system. *Jpn. Kokai Tokkyo Koho* JP 06,138,111 [94,138,111] (Cl. G01N30/02), 20 May 1994, Appl. 9/2/287,879, 29 Oct. 1992; 8 pp.; C.A., 121 (1994) 98847w.
- 61 Penton, Z.: Applications of a GC autosampler modifier for headspace sampling. *J. High Resolut. Chromatogr.*, 17 (1994) 647-650.
- 62 Pyo, D.: Programmed two-stage flow controller for supercritical fluid chromatography. *Analyst (Cambridge)*, 119 (1994) 1315-1318.
- 63 Rinkema, F.D., Louter, A.J.H. and Brinkman, U.A.T.: Large-volume injections in gas chromatography-atomic emission detection: an approach for trace-level detection in water analysis. *J. Chromatogr. A*, 678 (1994) 289-297.
- 64 Sacks, R.D. and Akard, M.: Gas chromatography system with column bifurcation and turnable selectivity. U.S. US 5,281,256 (Cl. 95-86; B01D15/08), 25 Jan. 1994, US Appl. 590,174, 28 Sep. 1990; 14 pp.; C.A., 120 (1994) 338115f.
- 65 Tanaka, H., Hasegawa, M. and Mitani, M.: (Gas chromatograph and its operation.) *Jpn. Kokai Tokkyo Koho* JP 06 27,096 [94 27,096] (Cl. G01N30/26), 04 Feb. 1994, Appl. 9/200,150, 06 Jul. 1992, 8 pp.; C.A., 121 (1994) 49302f.
- 66 Tokieda, T., Watanabe, S., Namiki, K. and Tsunogai, S.: (Development of a clean sampler for the determination of chlorofluorocarbons.) *Bunseki Kagaku*, 43 (1994) 827-830.
- 67 Vejrosta, J., Ansorgová, Planeta, J., Breen, D.G., Bartle, K.D. and Clifford, A.A.: Solute trapping in off-line supercritical fluid extraction using controlled modifier condensation. *J. Chromatogr. A*, 683 (1994) 407-410.
- 68 Yozawa, S. and Kurita, S.: (Apparatus for injecting samples for gas chromatography.) *Jpn. Kokai Tokkyo Koho* JP 06 94,692 [94 94,692] (Cl. G01N30/18), 08 Apr. 1994, Appl. 9/2/15,939, 31 Jan. 1992; 3 pp.; C.A., 121 (1994) 26041f.
- See also 117, 122, 124, 127, 133, 139, 152, 179, 181, 182, 184, 187, 188, 189, 194, 202, 247, 418, 442.
- 3b. *Detectors and detection reagents*
- 69 Abdel-Rehim, M., Zhang, L. and Hassan, M.: Effect of ammonia carrier gas on the response of the flame ionization detector. *J. High Resolut. Chromatogr.*, 17 (1994) 723-726.
- 70 Barsan, N. and Ionescu, R.: SnO₂-Based gas sensors as chromatographic detectors. *Sens. Actuators, B*, 19 (1994) 470-473; C.A., 121 (1994) 124107b.
- 71 Conte, E.D.: An aerosol alkali flame ionization detector for gas chromatography and high-performance liquid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9326186, 1993, 146 pp.; C.A., 121 (1994) 493369h.
- 72 Dressler, M. and Cigánek M.: Effect of detector temperature on the flame ionization detector response. *J. Chromatogr. A*, 679 (1994) 299-305.
- 73 Ducatte, G.R. and Long, G.L.: Effect of carbon dioxide and hydrogen on nonmetal emission intensities in a helium microwave-induced plasma. *Appl. Spectrosc.*, 48 (1994) 493-501; C.A., 121 (1994) 98491a.
- 74 Fukushima, T. and Tanabe, S.: Operating an electron-capture detector for gas chromatography. U.S. US 5,317,159 (Cl. 250-381; G01T1/185), 31 May 1994, JP Appl. 9/2/46,145, 31 Jan. 1992, 4 pp.; C.A., 121 (1994) 98750j.
- 75 Hao, C., Shepson, P.B., Drummond, J.W. and Muthuramu, K.: Gas chromatographic detector for selective and sensitive detection of atmospheric organic nitrates. *Anal. Chem.*, 66 (1994) 3737-3743.
- 76 Koch, M.: On the conversion of mass selective detector from gas chromatography/mass spectrometry application to stand-alone, on-line, real-time mass spectrometry application. *Rev. Sci. Instrum.*, 65 (1994) 2808-2818.
- 77 Kumar, U.T.: Element selective detection for liquid and supercritical fluid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9329899, 1993, 122 pp.; C.A., 120 (1994) 338066r.
- 78 Liu, Z. and Phillips, J.B.: Sensitivity and detection limit enhancement of gas chromatographic detection by thermal modulation. *J. Microcolumn Sep.*, 6 (1994) 229-235; C.A., 121 (1994) 124355f.
- 79 Madabushi, J.V.: Development and characterization of discharge-induced detectors for gas chromatography analysis. Avail. *Univ. Microfilms Int.*, Order No. DA9324500, 1993, 150 pp.; C.A., 121 (1994) 49370b.
- 80 Nagata, M., Kamiunten, S., Uchida, T. and Seita, M.: Thermal conductivity detector for a gas chromatograph. U.S. US 5,295,389 (Cl. 73-25.03; G01N31/00), 22 Mar. 1994, JP Appl. 9/1/232,461, 21 Aug. 1991; 8 pp.; C.A., 121 (1994) 26045k.

- 81 Park, B.E., Kim, H.S., Park, D.S. and Son, M.R.: (Matrix effect on gas chromatographic analysis with flame ionization detector.) *Hwahak Konghak*, 31 (1993) 804-812; C.A., 121 (1994) 25708s.
- 82 Thurbide, K.B. and Aue, W.A.: Reactive-flow luminescence detector for gas chromatography. *J. Chromatogr. A*, 684 (1994) 259-268.
- 83 Wentworth, W.E., Cai, H., Madabushi, J. and Qin, Y.: Pulsed-discharge helium ionization/electron capture/emission detector of chlorinated compounds. *Process Control Qual.*, 5 (1993) 193-204; C.A., 121 (1994) 49367f.
- 84 Yamada, T.: (Usefulness of gas chromatography with surface-ionization detection in forensic toxicology.) *Hochudoku*, 12 (1994) 108-111; C.A., 121 (1994) 101386c.
- See also 156, 173, 254, 292, 715.
- 3c. *Sorbents and columns, packing procedures*
- 85 Betts, T.J.: Comparison of two esterified γ -cyclodextrins with some other chirally selective gas chromatographic phases using volatile oil constituents. *J. Chromatogr. A*, 678 (1994) 370-374.
- 86 Butt, S.B., Riaz, M. and Ehsan-Ul-Haq: Thermally treated charcoal: a substitute to porous polymer packing material for the chromatographic analysis of permanent gases. *J. Chem. Soc. Pak.*, 16 (1994) 12-16; C.A., 121 (1994) 162817r.
- 87 De Zeeuw, J., Buyten, J., Peene, J. and Mohnke, M.: Metal capillary PLOT columns coated with Al_2O_3 , molsieve, and porous polymer adsorbents. *LC-GC Int.*, 7 (1994) 644-651.
- 88 Francotte, E., Grolimund, K. and Juvancz, Z.: Benzoylcellulose derivatives as chiral stationary phases for open tubular column chromatography. *Chirality*, 5 (1993) 232-237; C.A., 121 (1994) 72734g.
- 89 Fu, R. and Ge, J.: (Application of capillary gas chromatography in industrial analysis (VI). Use of crown ether substituted polysiloxane as stationary phase for capillary gas chromatography.) *Beijing Ligong Daxue Xuebao*, 13 (1993) 485-490; C.A., 121 (1994) 98796d.
- 90 Gavrilova, T.B., Nikitin, Y.S. and Rudnitskaya, T.A.: (Adsorbents based on symm-heptazine.) *Zh. Fiz. Khim.*, 68 (1994) 545-550.
- 91 Golovina, R.V., Terenina, M.B. Ruchkina, E.L. and Karnatsevich, V.L.: Fullerene C_{60} as a new stationary phase in capillary gas chromatography. *Mendeleev Commun.*, 6 (1993) 231-233; C.A., 121 (1994) 72735h.
- 92 Heijmans, H., de Zeeuw, J., Buyten, J., Peene, J. and Mohnke, M.: The use of PLOT columns in gas chromatography. *Am. Lab. (Shelton)*, 26 (1994) 28c-28h.
- 93 Kozlov, S., Trubnikov, V.I., Berezhkin, V.G., Storozhuk, I.P., Popova, T.P. and Sunkovich, G.V.: (Stationary phase for gas chromatography.) *U.S.S.R. SU 1,728,794* (Cl. G01N30/50), 23 Apr. 1992, Appl. 4,747,061, 11 Jul. 1989; C.A., 121 (1994) 124376p.
- 94 Liu, Y., Miao, L. and Kong, J.: (Performance of modified alumina as chromatographic stationary phase and its efficiency in the separation of gaseous hydrocarbons.) *Shiyou Huagong*, 23 (1994) 396-399; C.A., 121 (1994) 148052f.
- 95 Liu, Y., Yun, K.S. and Parcher, J.F.: Experimental method to distinguish column dead time from system dead time for the accurate determination of gas chromatographic void volumes: simultaneous pre- and postcolumn injection. *J. Chromatogr. A*, 679 (1994) 392-396.
- 96 Mori, R., Yamaguchi, H., Nakagama, T. and Hobo, T.: (Studies on stationary phase prepared with dimer acid and chiral amino acid for gas chromatography.) *Kuromatogurafi*, 14 (1993) 108-109; C.A., 121 (1994) 25976c.
- 97 Mukhina, V.P., Levin, Ya.A., Berezhkin, V.G. and Korolev, A.A.: (Hydroxyl-containing stationary phases for capillary gas chromatography.) *Zh. Anal. Khim.*, 49 (1994) 607-611.
- 98 Myano, S., Ooi, S. and Ochiai, Y.: Packing materials for gas chromatographic column for optical resolution. *Jpn. Kokai Tokkyo Koho JP 05,256,836* [93,265,836] (Cl. G01N30/48), 08 Oct. 1993, Appl. 92/88,114, 12 Mar. 1992, 8 pp.; C.A., 121 (1994) 49451d.
- 99 Nasuto, R., Rozylo, J.K., Musheghyan, A.V., Kamalyan, O.A. and Grigoryan, G.C.: Silica gel modified by styrene as a packing for gas chromatography. *Chem. Anal. (Warsaw)*, 39 (1994) 309-317.
- 100 Petersson, P., Reese, S.L., Yi, G., Yun, H., Malik, A., Bradshaw, J.S., Rossiter, B.E., Lee, M.L. and Markides, K.E.: Evaluation of β -cyclodextrin-based chiral stationary phases for capillary column supercritical fluid chromatography. *J. Chromatogr. A*, 684 (1994) 297-309.
- 101 Pirkle, W.H. and Bowen, W.E.: Chiral stationary phase design: A study in optimization. *J. High Resolut. Chromatogr.*, 17 (1994) 629-633.
- 102 Reese, S.L.: Synthesis of novel stationary phases for use in gas and supercritical fluid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9405104, 1993, 115 pp.; C.A., 121 (1994) 49399t.
- 103 Salehuddin, S.M. and Khan, A.H.: A comparative study of different stationary phases of gas-liquid chromatography for the determination of some phenolic compounds in tobacco condensate. *J. Bangladesh Acad. Sci.*, 17 (1993) 257-263; C.A., 121 (1994) 51628k.
- 104 Schmidt, L.W.: Chemically modified polymeric resins for solid-phase extraction and group separation prior to analysis by liquid or gas chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9335017, 1993, 123 pp.; C.A., 121 (1994) 49395p.
- 105 Shitangkoon, A. and Vigh, G.: Trichloroacetyl pentyl β -cyclodextrin as a chiral stationary phase for gas chromatography. *J. High Resolut. Chromatogr.*, 17 (1994) 727-728.
- 106 Song, X. and Gong, J.: (Studies of high-efficiency SE-54 crosslinked quartz capillary gas chromatographic column. Refit and application on Model 100 GC.) *Xiangtan Daxue Ziran Kexue Xuebao*, 16 (1994) 113-117; C.A., 121 (1994) 148046g.
- 107 Watanabe, C., Hashimoto, K. and Jinno, K.: (Capillary column in gas chromatography.) *Bunseki*, 6 (1994) 441-449; C.A., 121 (1994) 164443q - a review with 27 refs.
- 108 Wu, C., Hu, Z., Cheng, J., Lu, X. and Zeng, Z.: (Preparation, characteristics and separation mechanism of thio crown ether stationary phases.) *Gaodeng Xuexiao Huaxue Xuebao*, 15 (1994) 211-215; C.A., 121 (1994) 148030x.

- 109 Wu, Z.: The development of metal capillary columns and the use of inclusion compounds as stationary phases in gas chromatography. *Avail. Univ. Microfilms Int.*, Order No. DA9324508, 1993, 157 pp.; C.A., 121 (1994) 49391j.
- 110 Xu Hongsheng and Hong Hui: (Development on the gradient coated column in gas chromatography.) *Chin. J. Chromatogr.*, 12 (1994) 255-258.
- 111 Yancey, J.A.: Review of liquid phases in gas chromatography, part I: Intermolecular forces. *J. Chromatogr. Sci.*, 32 (1994) 349-357.
- 112 Yancey, J.A.: Review of liquid phases in gas chromatography. Part II: Application. *J. Chromatogr. Sci.*, 32 (1994) 403-413 - a review with 90 refs.
- 113 Zeng Zhaorui, Fan Jianhong, Chen Lei, Han Huimin, Wu Caiying, Huang Zaifu and Xu Wei: (Synthesis and preparation of double active functional group crown ether stationary phase for capillary gas chromatography (GC).) *Chin. J. Chromatogr.*, 12 (1994) 227-230.
- 114 Zhou, W., Fu, R., Dai, R., Huang, Z. and Chen, Y.: Use of a long-spacer-side-chain liquid crystalline polysiloxane containing a crown ether as a stationary phase for capillary gas chromatography. *J. High Resolut. Chromatogr.*, 17 (1994) 719-722.
- 115 Zou, G., Hu, G. and Zheng, Q.: (Synthesis of cellulose tribenzoate as gas chromatographic stationary phase and its characterization.) *Fenxi Huaxue*, 22 (1994) 370-372; C.A., 121 (1994) 49407u.

See also 16, 18, 20, 167, 168, 234, 335, 381.

3d. Quantitative analysis

- 116 Hachenberg, H.: Kalibrierung und Auswertung in der statischen Headspace-GC. *LaborPraxis*, 18, No. 4 (1994) 32-34.

See also 161, 353, 366, 388, 525, 572, 611, 672.

3e. Preparative scale chromatography

See 177, 307.

3f. Programmed temperature, pressure, vapors, gradients

- 117 Akard, M. and Sacks, R.: Pressure-turnable selectivity for high-speed gas chromatography. *Anal. Chem.*, 66 (1994) 3036-3041.
- 118 Al-Bajjari, T.I., Le Vent, S. and Taylor, D.R.: Calculation of programmed temperature gas chromatography characteristics from isothermal data IV. Prediction of peaks widths. *J. Chromatogr. A*, 683 (1994) 367-376.
- 119 Al-Bajjari, T.I., Le Vent, S. and Taylor, D.R.: Calculation of programmed temperature gas chromatography characteristics from isothermal data V. Prediction of peak asymmetries and resolution characteristics. *J. Chromatogr. A*, 683 (1994) 377-384.
- 120 Messadi, D., Ferchichi, L., Nouar, L. and Boughaloum, C.: (Comparison of some characteristic temperatures in programmed temperature gas chromatography.) *C. R. Acad. Sci., Ser. II: Mec., Phys., Chim., Astron.*, 319, No. 1 (1994) 53-56; C.A., 121 (1994) 148054h.

- 121 Messadi, D., Ferchichi, L., Rebbani, N. and Chaouli, A.: (Simulation of peak widths in programmed temperature gas chromatography.) *C. R. Acad. Sci., Ser. II: Mec., Phys., Chim., Sci. Terre Univers.*, 317, No. 10 (1993) 1293-1296; C.A., 121 (1994) 169308j.
- 122 Rubey, W.A.: An instrumental assembly for studying operational behavior of thermal gradient programmed gas chromatography. *Rev. Sci. Instrum.*, 65 (1994) 2802-2807.
- 123 Vezzani, S., Moretti P. and Castello, G.: Fast and accurate method for the automatic prediction of programmed-temperature retention times. *J. Chromatogr. A*, 677 (1994) 331-343.

See also 174.

4. SPECIAL TECHNIQUES

4a. Automation

- 124 Bowlin, D., Hott, C. and Davis, J.M.: Influence of integrator parameters on estimates calculated with the statistical model of overlap. *J. Chromatogr. A*, 677 (1994) 307-318.

See also 50, 123, 418.

4b. Computerization and modelling

- 125 Arena, J.V., Mazzarella, C.R. and Gluodenis, R.J.: Software-based deconvolution of gas chromatograms: an experiment for the instrumental analysis laboratory. *J. Chem. Educ.*, 71 (1994) 483-486; C.A., 121 (1994) 82034t.
- 126 Gonzales, C.: Computer system validation: A practical approach to an effective investment. *LC-GC Int.*, 7 (1994) 564-567.

See also 413.

4c. Combination with other physico-chemical techniques (MS, IR etc.)

- 127 Abraham, B.M.: Development of an on-site gas chromatography/mass spectrometer for rapid detection of polycyclic aromatic hydrocarbons and polychlorinated biphenyls at hazardous waste sites. *Avail. Univ. Microfilms Int.*, Order No. DA9324143, 1993, 165 pp.; C.A., 121 (1994) 49368g.
- 128 Albert, K., Braumann, U., Tseng, L.-H., Nicholson, G., Bayer, E., Spraul, M., Hofman, M., Dowle, C. and Chippendale, M.: Online coupling of supercritical fluid chromatography and proton high-field nuclear magnetic resonance spectroscopy. *Anal. Chem.*, 66 (1994) 3042-3046.
- 129 Baykut, G. and Franzen, J.: Mobile mass spectrometry: a decade of field applications. *TrAC*, 13 (1994) 267-275 - a review with 45 refs.
- 130 Brookes, S.T., Craig, K.S. and Cunnane, S.C.: Combined continuous-flow isotope-ratio mass spectrometry techniques for tracing the metabolism of ^{13}C -labeled fatty acids. *Biochem. Soc. Trans.*, 22, No. 2 (1994) 164S; C.A., 121 (1994) 53335m.
- 131 Doherty, S.J. and Winniford, W.L.: Rapid on-line analysis using a micromachined gas chromatograph coupled to a bench-top quadrupole mass spectrometer. *LC-GC Int.*, 12 (1994) 846-850.

- 132 Dworzanski, J.P., Kim M.-G., Snyder, A.P., Arnold, N.S. and Meuzelaar, H.L.C.: Performance advances in ion mobility spectrometry through combination with high speed vapor sampling, preconcentration and separation techniques. *Anal. Chim. Acta*, 293 (1994) 219-235.
- 133 Evans, E.H., Pretorius, W., Ebdon, L. and Rowland, S.: Low-pressure inductively coupled plasma ion source for molecular and atomic mass spectrometry. *Anal. Chem.*, 66 (1994) 3400-3407.
- 134 Gurka, D.F., Pyle, S., Titus, R. and Shafter E.: Direct-deposition infrared spectrometry with gas and supercritical fluid chromatography. *Anal. Chem.*, 66 (1994) 2521-2528.
- 135 Haefner, A.M.: Quantification of unidentified gas chromatographic elutes using infrared spectroscopy. Avail. *Univ. Microfilms Int.*, Order No. DA9402358, 1993, 133 pp.; C.A., 121 (1994) 26025d.
- 136 Jedrzejewski, P.T. and Taylor, L.T.: Evaluation of the particle beam interface for packed-column supercritical fluid chromatography-mass spectrometry with pure and modified CO₂. *J. Chromatogr. A*, 677 (1994) 365-376.
- 137 Kirschner, C.H.: Supercritical fluid extraction/chromatography and Fourier transform infrared spectrometry: methods optimization and application. Avail. *Univ. Microfilms Int.*, Order No. DA9319777, 1993, 181 pp.; C.A., 121 (1994) 49392k.
- 138 Krock, K.A. and Wilkins, C.L.: Quantitative aspects of a valve-based, multi-stage multidimensional gas chromatography-infrared spectroscopy-mass spectrometry system. *J. Chromatogr. A*, 678 (1994) 265-277.
- 139 Ligon, W.V. and Grade, H.: Adjustable open-split interface for a gas chromatograph and mass spectrometer. U.S. US 5,281,397 (Cl. 422-89; G01N30/02), 25 Jan. 1994, US Appl. 669,556, 14 Mar. 1991; 16 pp.; C.A., 120 (1994) 338116g.
- 140 Matney, M.L. and Limero, T.F.: Pyrolysis-gas chromatography/mass spectrometry analyses of biological particulates collected during recent space shuttle missions. *Anal. Chem.*, 66 (1994) 2820-2828.
- 141 Matsumoto, K.: Simple determination of relative hydrogen atom affinities by supercritical fluid chromatography/atmospheric pressure chemical ionization mass spectrometry. *Org. Mass Spectrom.*, 29 (1994) 266-268; C.A., 121 (1994) 34640r.
- 142 McClenen, W.H., Arnold, N.S. and Meuzelaar, H.L.C.: Field-portable hyphenated instrumentation: the birth of the tricorder? *TrAC*, 13 (1994) 286-293 - a review with 28 refs.
- 143 Meier-Augenstein, W., Brand, W., Hoffmann, G.F. and Rating, D.: Bridging the information gap between isotope ratio mass spectrometry and conventional mass spectrometry. *Biol. Mass Spectrom.*, 23, No. 6 (1994) 376-378; C.A., 121 (1994) 30115a.
- 144 Nimz, E.L.: Capillary gas chromatography/mass spectrometry following analytical transformation of molecules of biological significance. Avail. *Univ. Microfilms Int.*, Order No. DA9400256, 1993, 150 pp.; C.A., 121 (1994) 129292t.
- 145 Norton, K.L.: Direct deposition gas and supercritical fluid chromatography coupled with Fourier transform infrared spectrophotometry for the analysis of complex mixtures. Avail. *Univ. Microfilms Int.*, Order No. DA9414508, 1993, 182 pp.; C.A., 121 (1994) 148006u.
- 146 Ombaba, J.M.: Investigation of an alternating current plasma as an element selective atomic emission detector for high-resolution capillary gas chromatography and as a source for atomic absorption and atomic emission spectrometry. Avail. *Univ. Microfilms Int.*, Order No. DA9305335, 1992, 223 pp.; C.A., 121 (1994) 24600p.
- 147 Ootsuka, K. and Yamashita, Y.: (Analysis of microamount impurities.) *Jpn. Kokai Tokkyo Koho* JP 06 34,616 [94 34,616] (Cl. G01N30/72), 10 Feb. 1994, Appl. 92/185,518, 13 Jul. 1992, 5 pp.; C.A., 121 (1994) 49306k.
- 148 Ragunathan, N., Sasaki, T.A., Krock, K.A. and Wilkins, C.L.: Multidimensional fast gas chromatography with matrix isolated infrared detection. *Anal. Chem.*, 66 (1994) 3751-3756.
- 149 Reeves, J.B., III. and Schmidt, W.F.: Solid state ¹³C NMR analysis of forage and byproduct-derived fiber and lignin residues. Resolution of some discrepancies among chemical, infrared, and pyrolysis-gas chromatography-mass spectroscopic analysis. *J. Agric. Food Chem.*, 42 (1994) 1462-1468.
- 150 Smith, R.: Hyphenation - An overview. *LC-GC Int.*, 7 (1994) 505-516.
- 151 Toft, J., Kvalheim, O.M., Libnau, F.O. and Nodland, E.: Non-linear curve fitting of bilinear data using orthogonal projections for rank analysis. Applications to gas chromatography/infrared spectrometry and variable temperature infrared studies. *Vib. Spectrosc.*, 7 (1994) 125-137; C.A., 121 (1994) 169276x.
- 152 Wach, F.: Performance comes in smaller packages. *Anal. Chem.*, 66 (1994) 927-930.
- 153 Yang, J.: Combined supercritical fluid extraction/supercritical fluid chromatography/Fourier transform infrared spectrometry for the analysis of polar compounds deposits on polymeric matrixes. Avail. *Univ. Microfilms Int.*, Order No. DA9312464, 1992, 368 pp.; C.A., 120 (1994) 338099d.

See also 41, 63, 73, 76, 197, 211, 235, 326, 450, 464, 478, 482, 500, 695, 711, 715.

4e. Functional analysis

- 154 Panangadan, J.A.: Elemental analysis of organic compounds with fluorine combustion and gas chromatography separation. Avail. *Univ. Microfilms Int.*, Order No. DA9413093, 1993, 181 pp.; C.A., 121 (1994) 49441a.
- 155 Platonov, A.Y., Maiorova, H.D. and Kurzin, A.V.: (Gas chromatography method of methoxyl group determination.) *Khim. Drev.*, 5 (1993) 80-83; C.A., 121 (1994) 136409q.
- 156 Webster, C. and Cooke, M.: Use of microwave-induced plasma atomic emission detection for the quantification of oxygen containing compounds. *Anal. Proc.*, 31 (1994) 237-240.

See also 134.

4f. Trace analysis and preseparation techniques

- 157 Behzadi, H.: Trace organic analysis using GC/MS. Avail. *Univ. Microfilms Int.*, Order No. DA9221283, 1992, 139 pp.; C.A., 121 (1994) 25958y.
- 158 Gerhards, P. and Szigán, J.: Probenvorbereitung für Drogen-screening per GC/MS. *LaborPraxis*, 18, No. 10 (1994) 44-50.

- 159 Hawthorne, S.B., Yang, Y. and Miller, D.J.: Extraction of organic pollutants from environmental solids with sub- and supercritical water. *Anal. Chem.*, 66 (1994) 2912-2920.
- 160 Kaljurand, M. and Smit, H.C.: Comparison of sample concentration methods and correlation chromatography for polymer dynamic head-space studies. *Chromatographia*, 39 (1994) 210-215.
- 161 Mayer, M.L. and Poole, C.F.: Identification of the procedural steps that affects recovery of semi-volatile compounds by solid-phase extraction using cartridge and particle-loaded membrane (disk) devices. *Anal. Chim. Acta*, 294 (1994) 113-126.
- 162 Sommerville, B.A., Darling, F.M.C., McCormick, J.P., Waterhouse, J. and Broom, D.M.: A recirculating system for concentrating volatile samples. *Chromatographia*, 39 (1994) 469-474.
- 163 Starostin, I. and Witkiewicz, Z.: Environmental water samples preparation for chemical analysis. *Chem. Anal. (Warsaw)*, 39 (1994) 263-279 - a review with 91 refs.
- 164 Zhang, M. and Phillips, J.B.: Trace analysis of organics in aqueous samples by concentration in plastic tubing and multiplex gas chromatography. *Chromatographia*, 39 (1994) 294-298.

See also 66, 132, 147, 186, 498, 519, 654, 665.

4g. Enantiomers, separation

- 165 Schleimer, M., Fluck, M. and Schurig, V.: Enantiomer separation by capillary SFC and GC on Chirasil-Nickel: Observation of unusual peak broadening phenomena. *Anal. Chem.*, 66 (1994) 2893-2897.
- 166 Zeng Su: (Synthesis of chiral derivatization reagent *N*-heptafluorobutyl-L-prolyl chloride for gas chromatography (GC) and its characteristic tests.) *Chin. J. Chromatogr.*, 12 (1994) 358-360.
- 167 Zeng Su, Zhang Li, Shen Xiangzhong and Liu Zhiqiang: (Stereoisomer separations by gas chromatography.) *Chin. J. Chromatogr.*, 12 (1994) 259-262.
- 168 Zhou Xing, Wan Hong and Qu Qingyu: (Enantioselectivity and retention mechanisms of enantiomers on modified cyclodextrin derivatives in gas chromatography - A Discussion.) *Chin. J. Chromatogr.*, 12 (1994) 249-253.

See also 85, 88, 96, 98, 100, 101, 105, 214, 244, 270, 274, 275, 279, 318, 345, 367, 375, 379, 407, 443, 444, 514, 571, 579, 582, 586, 592, 612, 640.

4h. Other special techniques

- 169 Charmas, B., Gierak, A. and Leboda, R.: Dynamic techniques used in determination of traces of volatile substances in slightly volatile materials. *Chem. Anal. (Warsaw)*, 39 (1994) 1-11.
- 170 Corkill, J.A. and Raymond, K.W.: Manual head space sampling for gas chromatographic analysis. *J. Chem. Educ.*, 71 (1994) A202-A203.
- 171 Liu, Z., Sirimanne, S.R., Patterson, D.C.Jr., Needman, L.L. and Phillips, J.B.: Comprehensive two-dimensional gas chromatography for the fast separation and determination of pesticides extracted from human serum. *Anal. Chem.*, 66 (1994) 3086-3092.

- 172 Yun, X., Kou, D., Tian, Z., Tao, K. and Li, H.: (Theoretical analysis of method for flow perturbation gas chromatography.) *Wuli Huaxue Xuebao*, 10 (1994) 565-569; C.A., 121 (1994) 72760n.

See also 116, 567, 673.

4i. Supercritical fluid chromatography

- 173 Almquist, S.R., Nyholm, L. and Markides, K.E.: Electrochemical detection in open tubular column supercritical fluid chromatography using a platinum microelectrode and CO₂/water as mobile phase. *J. Microcolumn Separ.*, 6 (1994) 495-501.
- 174 Blackwell, J.A. and Schallinger, L.E.: Functional group selectivity using fluoroform as a mobile phase for supercritical fluid chromatography. *J. Microcolumn Separ.*, 6 (1994) 475-482.
- 175 Bond, P.M.: Supercritical fluid chromatography - finding a place in the chromatographers' arsenal? *Pestic. Sci.*, 41 (1994) 369-374; C.A., 121 (1994) 152387m - a review with 9 refs.
- 176 Chimowitz, E.H. and Vanpuylvelde, F.: Optimized chromatography system. U.S. US 5,305,232 (Cl. 364-498; B01D15/08), 19 Apr. 1994, Appl. 882,321, 13 May 1992; 18 pp.; C.A., 121 (1994) 12420s.
- 177 Crétier, G., Neffati, J. and Rocca, J.L.: Preparative LC and preparative SFC: Two complementary techniques in the fractionation of an impurity from a major component. *J. Chromatogr. Sci.*, 32 (1994) 449-454.
- 178 Dean, T.A.Jr.: Supercritical fluid chromatography: Investigations into retention, packed column design and instrumental developments. Avail. Univ. *Microfilms Int.*, Order No. DA9310642, 1992, 194 pp.; C.A., 120 (1994) 338064p.
- 179 Francis, E.S., Lee, M.L. and Richter, B.E.: Modifier addition in microcolumn supercritical fluid chromatography with a high pressure pulsed valve. *J. Microcolumn Separ.*, 6 (1994) 449-457.
- 180 Giddings, J.D.: New concepts that may extend the useful range of supercritical fluid chromatography. Avail. Univ. *Microfilms Int.*, Order No. DA49411948, 1993, 148 pp.; C.A., 121 (1994) 49195y.
- 181 Greibrokk, T.: Instrumentation for supercritical fluid chromatography. In: Dean, J.R. (Editor), *Appl. Supercrit. Fluids Ind. Anal.*, Blackie, Glasgow, 1993, pp. 12-45; C.A., 121 (1994) 136750u.
- 182 Heglund, D.L., Tilotta, D.C., Hawthorne, S.B. and Miller, D.J.: Simple fiber-optic interface for on-line supercritical fluid extraction Fourier transform infrared spectrometry. *Anal. Chem.*, 66 (1994) 3543-3551.
- 183 Hills, J.W., Hill, H.H., Jr., Hansen, D.R. and Metcalf, S.G.: Carbon dioxide supercritical fluid extraction of incinerator fly ash with a reactive solvent modifier. *J. Chromatogr. A*, 679 (1994) 319-328.
- 184 Hirata, Y. and Pawliszyn, J.: Solvent-free sample introduction for supercritical fluid chromatography using polymer coated fibers. *J. Microcolumn Separ.*, 6 (1994) 443-447.
- 185 Köhler, U., Biermanns, P. and Klesper, E.: Influence of linear velocity, column length, and pressure drop in SFC. I. Capacity ratios, selectivities, and theoretical plate heights. *J. Chromatogr. Sci.*, 32 (1994) 461-470.
- 186 McDowell, R.D.: The universal SPE method. *LC-GC Int.*, 7 (1994) 638-642.

- 187 Mellor, F., Just, U. and Strumpf, T.: Supercritical fluid extraction using a new restrictor design. *J. Chromatogr. A*, 679 (1994) 147-152.
- 188 Oudsema, J.W.: Innovate instrument design and applications in supercritical fluid chromatography and extraction. *Avail. Univ. Microfilms Int.*, Order No. DA9310700, 1992, 168 pp.; C.A., 120 (1994) 338045h.
- 189 Page, S.H., Morrison, J.F., Christensen, R.G. and Choquette, S.J.: Instrument for evaluating phase behavior of mixtures for supercritical fluid experiments. *Anal. Chem.*, 66 (1994) 3553-3557.
- 190 Ray, M.S.: Supercritical extraction: A bibliographic guide (1980-1993). *Sep. Sci. Technol.*, 29 (1994) 2203-2213.
- 191 Saito, M., Yamauchi, Y. and Okuyama, T.: *Fractionation by Packed-Column SFE and SFC Principles and Applications*. VCH Weinheim, New York, Basel, Cambridge, Tokyo, 1994, 276 p.
- 192 Stadler, M.P.: Prediction of carbon dioxide/hydrocarbon phase behavior using supercritical fluid chromatography. *Avail. Univ. Microfilms Int.*, Order No. DA9302317, 1992, 211 pp.; C.A., 121 (1994) 19301n.
- 193 Suarez, J.J., Bueno, J.L. and Medina, I.: Present status of instrumentation and applications for supercritical chromatography. *Quim Anal. (Barcelona)*, 12, No. 4 (1994) 192-204; C.A., 121 (1994) 148003r - a review with 180 refs.
- 194 Vejrosta, J., Mikesova, M., Ansorgova, A., Zatorsky, J., Hajar, M. and Janda, V.: Multichannel restrictor for supercritical fluid chromatography. *J. Microcolumn Sep.*, 6 (1994) 23-25.
- 195 Walker, D.F.G., Bartle, K.D. and Clifford, A.A.: Determination of the oil content of rapeseed by supercritical fluid extraction. *Analyst (Cambridge)*, 119 (1994) 1471-1474.
- 196 Westwood, S.A. (Editor): *Supercritical Fluid Extraction and Its Use in Chromatographic Sample Preparation*. Blackie, Glasgow, 1993, 186 p.
- See also 60, 62, 73, 77, 100, 102, 128, 134, 136, 137, 141, 145, 150, 153, 304, 306, 313, 372, 376, 389, 410, 471, 476, 482, 489, 491, 492, 495, 521, 524, 535, 556, 559, 560, 581, 582, 592, 602, 625, 626, 681.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5a. Aliphatic hydrocarbons

- 197 Baylis, S.A., Hall, K. and Jumeau, E.J.: The analysis of the C₁-C₅ components of natural gas samples using gas chromatography-combustion-isotope ratio mass spectrometry. *Org. Geochem.*, 21 (1994) 777-785; C.A., 121 (1994) 160439v.
- 198 Guilbaud, R., Ricard, A.C., Daniel, C., Boileau, S., Huu, V.T. and Chevalier, G.: A method to evaluate lipid peroxidation by an automated analysis of exhaled pentane in human and rat breath. *Toxicol. Methods*, 4 (1994) 1-11; C.A., 120 (1994) 318481u.
- 199 Hou, X.: (Analysis of the gas in transformer oil by gas chromatography.) *Fenxi Shiyanshi*, 13 (1994) 79-82; C.A., 121 (1994) 87137p.
- 200 Naeemi, E.D. and Al-Kandari, S.: An improved method for determination of light hydrocarbons in stabilized crude oil. *Chromatographia*, 39 (1994) 363-365.
- 201 Peters, A.J.: Instrumentation and strategies for the analysis of light hydrocarbons using high-speed gas chromatography. *Avail. Univ. Microfilms Int.*, Order No. DA9308419, 1992, 197 pp.; C.A., 120 (1994) 338061k.
- 202 Sakamoto, S. and Ooya, T.: (Method and apparatus for separation of low-boiling-point hydrocarbons.) *Jpn. Kokai Tokkyo Koho* JP 06,148,166 [94,148,166] (Cl. G01N30/88), 27 May 1994, Appl. 92/316,660, 31 Oct. 1992; 4 pp.; C.A., 121 (1994) 124368s.
- 203 Schreiber, G.A., Schulzki, G., Spiegelberg, A., Helle, N. and Bögl, K.W.: Evaluation of a gas chromatographic method to identify irradiated chicken, pork, and beef by detection of volatile hydrocarbons. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1202-1217.
- 204 Springfield, J.R. and Levitt, M.D.: Pitfalls in the use of breath pentane measurements to assess lipid peroxidation. *J. Lipid Res.*, 35 (1994) 1497-1504; C.A., 121 (1994) 129071v.
- 205 Strongoli, M.L., Vaquero, M.T., Comellas, L. and Broto-Puig, F.: The fate of petroleum aliphatic hydrocarbons in sewage sludge-amended soils. *Chemosphere*, 29 (1994) 273-282.
- 206 Yang Yuguo: (Determination of olefins and paraffins in products of Olex unit by capillary gas chromatography.) *Chin. J. Chromatogr.*, 12 (1994) 375.
- 207 Zhu Junzhang and Wang Peirong: (The identification of nC₄-nC₁₄ fraction in crude oil and its preliminary geological applications.) *Chin. J. Chromatogr.*, 12 (1994) 336-341.

See also 16, 92.

5b. Cyclic hydrocarbons, fullerenes

- 208 Bayer, C.W.: Advances in trapping procedures for organic indoor pollutants. *J. Chromatogr. Sci.*, 32 (1994) 312-316.
- 209 Bemgaard, A., Lundmark, B.O. and Colmsjoe, A.: Gas chromatographic analysis of PAHs with molecular weights exceeding 300 dalton. *Polycyclic Aromat. Compd.*, 3 (1993) 603-610; C.A., 120 (1994) 329947b.
- 210 Johnston, J.J., Wong, J.P., Feldman, S.E. and Ilnicki, L.P.: Purge and trap/gas chromatography/mass spectrometry method for determining smoke contamination of foods and packaging materials. *J. Agric. Food Chem.*, 42 (1994) 1954-1958.
- 211 Jones, A.D., Dunlap, M.R. and Gospe, S.M.Jr.: Stable-isotope dilution GC-MS for determination of toluene in sub-milliliter volumes of whole blood. *J. Anal. Toxicol.*, 18 (1994) 251-254; C.A., 121 (1994) 150653w.
- 212 Jüttner, F.: Emission of aromatic hydrocarbons and aldehydes into the water by a four-strike outboard motor: Quantitative measurements. *Chemosphere*, 29 (1994) 191-200.
- 213 Kadowaki, S., Naito, H. and Mizoguchi, K.: (Gas chromatography/mass spectrometric analysis of polycyclic aromatic hydrocarbons in environmental samples (1): application to airborne dust samples.) *Aichi-ken Kogai Chosa Senta Shoho*, 21 (1993) 7-14; C.A., 121 (1994) 116338n.
- 214 Koenig, W.A., Gehrcke, B., Hochmuth, D.H., Mlynek, C. and Hopf, H.: Resolution of chiral [2,2]paracyclophanes by enantioselective gas chromatography. *Tetrahedron: Asymmetry*, 5 (1994) 347-350; C.A., 121 (1994) 133659k.

- 215 Lien, W.F.J.C.: Gas chromatography techniques for studying polycyclic aromatic hydrocarbons in aqueous solution and organic volatiles in emissions from incineration of CFC-11 containing polyurethane foam. *Avail. Univ. Microfilms Int.*, Order No. DA9405122, 1993, 167 pp.; C.A., 121 (1994) 49400m.
- 216 MacGillivray, B., Pawliszyn, J., Fowlie, P. and Sagara, C.: Headspace solid-phase microextraction versus purge and trap for the determination of substituted benzene compounds in water. *J. Chromatogr. Sci.*, 32 (1994) 317-322.
- 217 Ong, C.-N. and Lee, B.-L.: Determination of benzene and its metabolites: Application in biological monitoring of environmental and occupational exposure to benzene. *J. Chromatogr. B*, 660 (1994) 1-22 - a review with 89 refs.
- 218 Robert, E., Beboulene, J.-J., Codet, G. and Enache, D.: High-performance liquid chromatography coupled off-line with capillary gas chromatography. Application to the determination of the aromatics content in middle distillates. *J. Chromatogr. A*, 683 (1994) 215-222.
- 219 Saiz-Jimenez, C.: Production of alkylbenzenes and alkynaphthalenes upon pyrolysis of unsaturated fatty acids. *Naturwissenschaften*, 81 (1994) 451-453.
- 220 Steele, D.H., Thornburg, M.J., Stanley, J.S., Miller, R.R., Brooke, R., Cushman, J.R. and Cruzan, G.: Determination of styrene in selected foods. *J. Agric. Food Chem.*, 42 (1994) 1661-1665; C.A., 121 (1994) 106788v.
- 221 Van de Wiel, H.J., Bloemen, H.J.T. and Bos, H.P.: Determination of the long-term averaged concentration of volatile aromatic hydrocarbons in indoor air by charcoal adsorption, solvent extraction and gas chromatography. *IARC Sci. Publ.*, 109 (1993) 221-227; C.A., 121 (1994) 41559z.
- 222 Wu Caiying, Zhu Tianqin, Cai Lingshuang and Zhou Xichun: (Retention mechanism of aromatic compounds on benzo-crown ether polysiloxane stationary phases.) *Chin. J. Chromatogr.*, 12 (1994) 320-323.
- 223 Yamada, S., Kuroki, H., Maeda, M., Takagi, M. and Yamashita, T.: Characterization of pyrene photoproducts in chloroform by gas chromatography and gas chromatography-mass spectrometry. *Microchem. J.*, 49 (1994) 117-125; C.A., 120 (1994) 322567u.
- 224 Zhao, G., Li, Z., Liu, L. and Zhu, S.: (Control analysis in styrene production by 530- μ m fused-silica capillary gas chromatography.) *Shiyou Huagong*, 22 (1993) 187-190; C.A., 121 (1994) 84016n.
- See also 26, 127, 141, 159, 225, 226, 233, 235, 311, 658.
- Sc. Halogen derivatives
- 225 Andronikashili, T., Eprikashvili, L., Pirtskalava, N. and Witkiewicz, Z.: Chromatographic separation of isomers of monofluorotoluene, monochlorotoluene and xylene. *Chem. Anal. (Warsaw)*, 39 (1994) 509-513.
- 226 Barnabas, I.J., Dean, J.R. and Owen, S.R.: Supercritical fluid extraction of analytes from environmental samples. *Analyst (Cambridge)*, 111 (1994) 2381-2394.
- 227 Bøewadt, S., Skejø-Andresen, H., Montanarella, L. and Larsen, B.: HRGC separations of 160 chlorobiphenyls in technical mixtures on four polar narrow-bore columns. *Intern. J. Environ. Anal. Chem.*, 56 (1994) 87-107.
- 228 Bruner, F., Crescentini, G., Maione, M. and Mangani, F.: Chlorofluorocarbons measurement in the lower atmosphere of the Antarctica. *Intern. J. Environ. Anal. Chem.*, 55 (1994) 311-318.
- 229 Bruno, T.J. and Caciari, M.: Retention of halocarbons on a hexafluoropropylene epoxidemodified graphitized carbon black II. Ethane-based compounds. *J. Chromatogr. A*, 679 (1994) 123-132.
- 230 Bush, B., Dzurica, S., Wood, L. and Madrigal, E.C.: Sampling the Hudson River estuary for PCBs using multiplate artificial substrate samplers and congener-specific gas chromatography in 1991. *Environ. Toxicol. Chem.*, 13, No. 8 (1994) 1259-1272; C.A., 121 (1994) 141020k.
- 231 Desideri, P.G., Lepri, L., Checchini, L. and Santanni, D.: Organic compounds in surface and deep antarctic snow. *Intern. J. Environ. Anal. Chem.*, 55 (1994) 33-46.
- 232 Fingler, S., Tkalcovic, Fröbe, Z. and Drevendar, V.: Analysis of polychlorinated biphenyls, organochlorine pesticides and chlorophenols in rain and snow. *Analyst (Cambridge)*, 119 (1994) 1135-1140.
- 233 Ishizuka, S. and Hayakari, S.: Measurement of chemical substances in water and sediments by gas chromatography/mass spectrometry. *Aomori-ken Kankyo Hoken Senta Kenkyu Hokoku*, 4 (1994) 38-46; C.A., 121 (1994) 42174g.
- 234 Järnberg, U., Asplund, L. and Jakobsson, E.: Gas chromatographic retention behaviour of polychlorinated naphthalenes on non-polar, polarizable, polar and smectic capillary columns. *J. Chromatogr. A*, 683 (1994) 385-396.
- 235 Kondoh, H., Okuyama, H. and Murata, K.: (Analysis for 23 volatile organic compounds by purge and trap capillary gas chromatography-mass spectrometry (GC/MS).) *Hokkaido Kankyo Kagaku Kenkyu Senta Shoho*, 20 (1993) 41-53; C.A., 121 (1994) 49422v.
- 236 Konyukhova, S.V., Maksimov, B.N. and Zenkevich, I.G.: (Identification of fluorine-containing compounds by gas chromatographic retention indexes.) *Zh. Prikl. Khim. (S.-Peterburg)*, 67 (1994) 135-137; C.A., 121 (1994) 124348f.
- 237 Konyukhova, S.V., Zenkevich, I.G. and Maksimov, B.N.: (Formation of full data bases of gas-chromatographic retention indexes for halogen derivatives of the simplest hydrocarbons on standard sorbents.) *Zh. Anal. Khim.*, 49 (1994) 402-409; C.A., 120 (1994) 338077v.
- 238 Kristiansen, N.K., Frøshaug, M., Aune, K.T. and Becher, G.: Identification of halogenated compounds in chlorinated seawater and drinking water produced offshore using *n*-pentane extraction and open-loop stripping technique. *Environ. Sci. Technol.*, 28 (1994) 1669-1673.
- 239 Kuznetsova, L.V. and Nogina, S.P.: (Gas chromatographic determination of 1,3-chlorobromopropane in air of populated areas.) *Gig. Sanit.*, 1 (1994) 40; C.A., 121 (1994) 16606e.
- 240 Luotamo, M.: (Detection of exposure to polychlorinated biphenyls.) *Kem.-Kemi.*, 20 (1993) 616-618; C.A., 121 (1994) 28674p.
- 241 Marquis, P.J., Hanson, R.L., Larsen, M.L., DeVita, W.M., Butterworth, B.C. and Kuehl, D.W.: Analytical methods for a national study of chemical residues in fish II: Pesticides and polychlorinated biphenyls. *Chemosphere*, 29 (1994) 508-521.
- 242 Patil, S.F. and Lonkar, S.T.: Evaluation of Tenax TA for the determination of chlorobenzene and chloronitrobenzenes in air using capillary gas chromatography and thermal desorption. *J. Chromatogr. A*, 684 (1994) 133-142.

- 243 Pauné, F., Rivera, J., Espadaler, I. and Caixach, J.: Determination of polychlorinated biphenyls in sewage sludges from Catalonia (N.E. Spain) by high-resolution gas chromatography with electron-capture detection. *J. Chromatogr. A.*, 684 (1994) 289-296.
- 244 Reinhardt, R., Engewald, W., Goj, O. and Haufe, G.: Enantioselective separation of side-chain fluorinated alkylbenzenes by capillary gas chromatography on cyclodextrin phases. *Chromatographia*, 39 (1994) 192-199.
- 245 Sacks, R. and Akard, M.: High-speed GC analysis of VOCs: Turnable selectivity and column selection. *Environ. Sci. Technol.*, 28 (1994) 428-433.
- 246 Schreitmüller, J., Vigneron, M., Bacher, R. and Ballschmiter, K.: Pattern analysis of polychlorinated biphenyls (PCB) in marine air of the Atlantic Ocean. *Intern. J. Environ. Anal. Chem.*, 57 (1994) 33-52.
- 247 Sippola, E., Himberg, K., David, F. and Sandra, P.: Real-time controlled multidimensional gas chromatography with electronic pressure control: application to chlorobiphenyl analysis. *J. Chromatogr. A.*, 683 (1994) 45-50.
- 248 Tamilarasan, R., Morabito, P.L., Lamparski, L., Hazelwood, P. and Butt, A.: Determination of neutral chlorinated extractable organic compounds in water samples using large volume on-column injection capillary gas chromatography-mass spectrometry. *J. High Resolut. Chromatogr.*, 17 (1994) 689-694.
- 249 Zjawiony, I.: Chromatographic and polarographic determination of vinyl chloride evolved during the ageing process of polyvinyl chloride and its products. *Chem. Anal. (Warsaw)*, 39 (1994) 645-649.
- 250 Zoccolillo, L. and Rellori, M.: Halocarbons in antarctic surface waters. *Intern. J. Environ. Anal. Chem.*, 55 (1994) 27-32.
- 251 Zupancic-Kralj, L., Marsel, J., Kralj, B. and Đigon, D.: Application of tandem mass spectrometry to the analysis of chlorinated compounds. *Analyst (Cambridge)*, 119 (1994) 1129-1134.
- See also 19, 35, 41, 66, 83, 127, 208, 509, 512, 519, 521, 543, 655, 658, 668, 672, 687.
- 5d. Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)
- 252 Ali, M.A. and Kosat, N.: Application of multicolumn valve switching gas chromatography for the analysis of naphta and kerosine fractions of Saudi Arabian light crude oil. *Fuel Sci. Technol. Int.*, 12 (1994) 567-580; C.A., 120 (1994) 327111a.
- 253 Bartulewicz, J., Bartulewicz, E., Gawlowski, J. and Niedzielski, J.: Simple and rapid method for determination of petroleum products in water. *Chem. Anal. (Warsaw)*, 39 (1994) 167-177.
- 254 Cao, X.-L., Hewitt, C.N. and Waterhouse, K.S.: Determination of reactive hydrocarbons by capillary gas chromatography with the reduction gas detector. *J. Chromatogr. A.*, 679 (1994) 115-121.
- 255 Carlson, D.A., Milstrey, S.K. and Narang, S.K.: Classifications of tsetse flies *Glossina* spp. (Diptera: Glossinidae) by gas chromatographic analysis of cuticular components. *Bull. Entomol. Res.*, 83 (1993) 507-515; C.A., 121 (1994) 78837q.
- 256 Ciccioli, P., Cecinato, A., Brancaleoni, E., Montagnoli, M. and Allegrini, I.: Chemical composition of particulate organic matter (POM) collected at Terra Nova bay in Antarctica. *Intern. J. Environ. Anal. Chem.*, 55 (1994) 47-59.
- 257 Furton, K.G., Huang, C.-W., Jaffé, R. and Sicre, M.A.: High temperature supercritical fluid extraction of hydrocarbons from geological samples and comparison to soxhlet extraction. *J. High Resolut. Chromatogr.*, 17 (1994) 679-681.
- 258 Garg, A.K. and Philp, R.P.: Pyrolysis-gas chromatography of asphaltenes/kerogens from source rocks of the Gandhar Field, Cambay Basin, India. *Org. Geochem.*, 21 (1994) 383-392; C.A., 121 (1994) 87051f.
- 259 Jayatilaka, A. and Poole, C.F.: Identification of petroleum distillates from fire debris using multidimensional gas chromatography. *Chromatographia*, 39 (1994) 200-209.
- 260 Ken-ichi, A. and Kazuhiko, S.: (Analytical method of hydrocarbon composition in automotive exhaust gas by multi dimension GC with large volume gas loop.) *Bunseki Kagaku*, 17 (1994) 789.
- 261 Milligan, P.J.M., Phillips, A., Broomfield, G., Molyneux, D.H., Toure, Y. and Coluzzi, M.: A study of the use of gas chromatography of cuticular hydrocarbons for identifying of the *Anopheles gambiae* (Diptera: Culicidae) complex. *Bull. Entomol. Res.*, 83 (1993) 613-624; C.A., 121 (1994) 78838r.
- 262 Pakdel, H. and Roy, C.: Simultaneous gas chromatographic-Fourier transform infrared spectroscopic-mass spectrometric analysis of synthetic fuel derived from used tire vacuum pyrolysis oil, naptha fraction. *J. Chromatogr. A.*, 683 (1994) 203-214.
- 263 Roques, D.E., Overton, E.B. and Henry, C.B.: Using gas chromatography/mass spectrometry fingerprint analyses to document process and progress of oil degradation. *J. Environ. Qual.*, 23 (1994) 851-855; C.A., 121 (1994) 91102r.
- 264 Wang, Z., Fingas, M. and Li, K.: Fractionation of a light crude oil and identification and quantitation of aliphatic, aromatic, and biomarker compounds by GC-FID and GC-MS, Part I. *J. Chromatogr. Sci.*, 32 (1994) 361-366.
- 265 Wang, Z., Fingas, M. and Li, K.: Fractionation of a light crude oil and identification and quantitation of aliphatic, aromatic, and biomarker compounds by GC-FID and GC-MS, Part II. *J. Chromatogr. Sci.*, 32 (1994) 367-382.
- 266 Wineman, P.L. and Kote, R.O.: Target-compound method for the analysis of accelerant residues in fire debris. *Anal. Chim. Acta*, 288 (1994) 97-110.
- 267 Yokoyama, S., Mishima, H., Satou, M. and Sunada, Y.: Structural changes of oils estimated by GC-MS analyses method during upgrading of SRC-II coal liquid. *Sekiyu Gakkaishi*, 37 (1994) 419-427; C.A., 121 (1994) 87331x.
- 268 Zhu, Z., Li, C., Wang, P. and Zhu, M.: (GC-MS analysis of saturated hydrocarbons and light aromatics in vacuum gas oil and its hydrogenated product.) *Huadong Huagong Xueyuan Xuebao*, 19 (1993) 746-753; C.A., 121 (1994) 38858r.
- See also 15, 34, 674.
6. ALCOHOLS
- 269 Ferrala, N.F., Burhan, I.G. and Nomeir, A.A.: Determination of 1-methoxy-2-propanol and its metabolite 1,2-propanediol in rat and mouse plasma by gas chromatography. *J. Chromatogr. B*, 660 (1994) 291-296.

- 270 Gamoh, K., Ketuly, K.A., Cole, W.J., Brooks, C.J.W. and Anderson, R.A.: Chromatographic and mass-spectrometric studies of cyclic 2-(N,N-dimethylaminoethoxy)ferroceneboronates and related esters. *Anal. Sci.*, 10 (1994) 705-711.
- 271 Huang, Z., Nie, H. and Pei, S.: (Determination of propanol-1 in industrial propanol and study of its impurities.) *Huaxue Shijie*, 34 (1993) 173-175; C.A., 120 (1994) 338101y.
- 272 Jin, N., Zhao, R., Dai, J. and Chen, J.: (Simultaneous analysis of ethanol and acetate in blood by headspace gas chromatography.) *Nanjing Yixueyuan Xuebao*, 14 (1994) 146-148; C.A., 121 (1994) 30160m.
- 273 Kirsch, N.H. and Stan, H.-J.: Gas chromatographic-mass spectrometric determination of chlorinated *cis*-1,2-dihydroxycyclohexadienes and chlorocatechols as their boronates. *J. Chromatogr. A*, 684 (1994) 277-287.
- 274 Koenig, W.A., Gehrcke, B. and Weseloh, G.: Determination of the absolute configuration of secondary alcohols with Horeau's method including enantioselective gas chromatography. *Chirality*, 6 (1994) 141-147; C.A., 121 (1994) 82189x.
- 275 Küsters, E. and Portmann, A.: Enantiometric separation of amino alcohols by gas chromatography on a chiral stationary phase; influence of the perfluoroacylating reagent on the separation. *J. High Resolut. Chromatogr.*, 17 (1994) 639-642.
- 276 Linkiewicz, M. and Poskrobko, H.: Determination of impurities in 2-(2-ethoxyethoxy)ethanol by gas chromatography. *Chem. Anal. (Warsaw)*, 39 (1994) 93-96; C.A., 121 (1994) 72773u.
- 277 Minero, C., Vincenti, M. and Pelizzetti, E.: Determination of ethylene glycol in aqueous matrix by direct derivatization with hexyl chloroformate. *Ann. Chim. (Rome)*, 83 (1993) 511-521; C.A., 120 (1993) 338095z.
- 278 Pounder, D.J. and Kuroda, N.: Vitreous alcohol is of limited value in predicting blood alcohol. *Forensic. Sci. Int.*, 62, No. 5 (1994) 73-80; C.A., 121 (1994) 75490k.
- 279 Powers, L., Ciraolo, S.T., Agarwal, K.C., Kumar, A., Bomont, C., Soloviev, M.V., David, F., Desrochers, S. and Brunengraber, H.: Assay of the enantiomers of 1,2-propanediol, 1,3-butanediol, 1,3-pentanediol and the corresponding hydroxyacids by gas chromatography-mass spectrometry. *Anal. Biochem.*, 221 (1994) 323-328.
- 280 Shen, Y., Cao, G., Sun, J. and Cheng, G.: (Gas chromatographic analysis of major alcohol and ester constituents in Baijiu.) *Nianqiu*, 2 (1994) 32-40; C.A., 121 (1994) 81239b.
- 281 Xu, L.: (GC determination of ethanol in doxycycline hydrochloride.) *Yaowu Fenxi Zazhi*, 14 (1994) 35-36; C.A., 121 (1994) 91998n.
- 282 Yablochkin, V.D.: (Determination of ethanol in urine by vapor-phase gas chromatography.) *Gig. Sanit.*, 5 (1993) 68-70; C.A., 120 (1994) 317418s.
- 283 Zhou, Z., Zheng, E. and Feng, D.: (Determination of trace amount of organic solvent in water by freezing-preconcentration gas chromatography.) *Nanjing Huagong Xueyuan Xuebao*, 16, No. 1 (1994) 67-71; C.A., 121 (1994) 163548r.
- See also 32, 40, 43, 115, 364, 381, 460, 675.
7. PHENOLS
- 284 Casabianca, H., Seiller, I. and Bigois, M.: (Use of supercritical fluid extraction (SFE) and gas chromatography with an atomic-emission detector (GC-AED) for determination of substituted phenolic compounds.) *Spectra Anal.*, 22 (1993) 31-35; C.A., 121 (1994) 148049k.
- 285 Casais, C., Lorenzo, R.A., Rubí, E. and Cela, R.: Headspace gas-chromatography method for the rapid determination of phenol and cresols in soils. *Quím. Anal. (Barcelona)*, 12 (1993) 173-176; C.A., 121 (1994) 156426w.
- 286 Chopra, S.K., Kapoor, V.B., Vishnoi, S.C. and Bhagat, S.D.: Analysis of phenolic-type antioxidants. Capillary gas chromatography. *Erdoel Kohle, Erdgas, Petrochem.*, 47 (1994) 230-233; C.A., 121 (1994) 112971r.
- 287 Cuartero, M., Gahery, R., van Doorn, M., L'her, E. and Declercq, B.: (Determination of pentachlorophenol in leather by liquid chromatography with electrochemical detection and by gas chromatography-mass spectrometry.) *Ann. Falsif. Expert. Chim. Toxicol.*, 86 (1993) 379-386; C.A., 121 (1994) 2688w.
- 288 Cui, D., Chen, Y., Lu, J., Chen, W. and Wang, B.: (Gas chromatographic determination of *p*-chlorophenol in air.) *Zhonghua Yufang Yixue Zazhi*, 27 (1993) 360-362; C.A., 121 (1994) 41599n.
- 289 Geissler, A. and Schoeler, H.F.: Gas-chromatographic determination of phenol, methylphenols, chlorophenols, nitrophenols and nitroquinones in water at 0.1 µg L⁻¹. *Water Res.*, 28 (1994) 2047-2053; C.A., 121 (1994) 141126z.
- 290 Kurata, Y.: (Determination of phenols in water by direct acylation.) *Kankyo Kagaku*, 4, No. 1 (1994) 55-64; C.A., 121 (1994) 163528j.
- 291 Lugowska, E.: Direct determination of hydroxybenzoic acids by gas chromatography. *Chem. Anal. (Warsaw)*, 39 (1994) 281-287.
- 292 Turnes, M.I., Rodriguez, I., Mejuto, M.C. and Cela, R.: Determination of chlorophenols in drinking water samples at the sub-nanogram per millilitre level by gas chromatography with atomic emission detection. *J. Chromatogr. A*, 683 (1994) 21-29.
- 293 Vilaplana, J., López, J. and Jiménez A.: Combined solvent extraction-mass spectrometry determination of free phenol traces in poly(vinyl chloride) products. *J. Chromatogr. A*, 679 (1994) 133-138.
- See also 103, 232, 273, 364.
8. SUBSTANCES CONTAINING HETERO CYCLIC OXYGEN
- 8a. Flavonoids
- 294 Yan, Y., Tan, H.S.I. and Guinchard, C.: (Determination of psoralens by gas chromatography.) *Ann. Pharm. Fr.*, 52, No. 3 (1994) 160-167; C.A., 121 (1994) 65715y.

8b. Aflatoxins and other mycotoxins

- 295 Pestka, J.J., Azcona-Olivera, J., Plattner, R.D., Minervini, F., Dokó, M.B. and Visconti, A.: Comparative assessment of fumonisin in grain-based foods by ELISA, GC-MS, and HPLC. *J. Food Prot.*, 57 (1994) 169-172; C.A., 120 (1994) 321629d.
- 296 Terai, T., Uda, T., Kataoka, J. and Tetsumi, T.: (Assay of grayanotoxins by gas chromatography.) *Nippon Noge Kagaku Kaishi*, 68 (1994) 979-981; C.A., 121 (1994) 33452u.
- 8c. Other compounds with heterocyclic oxygen (incl. tannins)
- 297 Bonifazi, P., Mastrogiacomo, A.R., Pierini, E. and Bruner, F.: Solid phase extraction of polychlorodibenzodioxins and polychlorodibenzofurans dissolves in particle-free water containing humic substances. *Intern. J. Environ. Anal. Chem.*, 57 (1994) 21-31.
- 298 Chatkittunkwong, W. and Creaser, C.S.: Bromo-, bromochloro- and chloro-dibenzo-p-dioxins and dibenzofurans in incinerator fly ash. *Chemosphere*, 29 (1994) 559-566.
- 299 Espadaler, I., Sistach, M.C., Caixach, J., Cortina, M. and Rivera J.: (Application of mass spectrometry to the determination of gallic acid and sugars for characterization of ferrogallic inks (14th, 16th, 17th and 18th centuries). *Quim. Anal. (Barcelona)*, 13, No. 2 (1994) 59-62; C.A., 121 (1994) 156624j.
- 300 Franzén, R. and Kronberg, L.: Determination of chlorinated 5-methyl-5-hydroxyfuranones in drinking water, in chlorinated humic water, and in pulp bleaching liquor. *Environ. Sci. Technol.*, 28 (1994) 2222-2227.
- 301 Luijk, R., Dorland, K., Smit, P. and Govers, H.A.J.: Prediction of the gas chromatographic retention behavior of polybrominated dibenzo-p-dioxins: Preliminary results. *Polycyclic Aromat. Compd.*, 3 (1994) 565-572; C.A., 121 (1994) 116778f.
- 302 Marquis, P.J., Hackett, M., Holland, L.G., Larsen, M.L., Butterworth, B. and Kuehl, D.W.: Analytical methods for a national study of chemical residues in fish I: Polychlorinated dibenzo-p-dioxins/dibenzofurans. *Chemosphere*, 29 (1994) 495-508.
- 303 Matsueda, T., Takata, S., Nakamura, M., Kurokawa, Y., Hisamichi, K. and Fukamachi, K.: (Determination of nereistoxin and thiocyclam in environmental samples by gas chromatography/mass spectrometry.) *Kankyo Kagaku*, 4, No. 1 (1994) 19-27; C.A., 121 (1994) 141071c.
- 304 Miao, Z., Zhang, Z. and Pawliszyn, J.: Supercritical fluid extraction and clean-up with temperature fractionation: Application to determination of polychlorinated dibenzo-p-dioxins. *J. Microcolumn Separ.*, 6 (1994) 459-465.
- 305 Novikova, M.B.: (Determination of polychlorinated dibenzodioxins and dibenzofurans. Environmental Protection Agency (EPA) methodology.) *Zh. Ekol. Khim.*, 3 (1993) 213-218; C.A., 121 (1994) 169311e.
- 306 Walther, W. and Netscher, T.: Open-tubular column supercritical fluid chromatography: Analysis of thermolabile intermediates useful in natural product synthesis. *J. Chromatogr. Sci.*, 32 (1994) 418-425.
- 307 Zhou Yingcai, Wang Xiuying and Xu Peishu: (Preparative gas chromatography of ipomeamarone.) *Chin. J. Chromatogr.*, 12 (1994) 367-368.

See also 251.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 308 Boneva, S. and Toromanova-Petrova, P.: Capillary gas chromatography of C₁-C₄ alkyl tert.-butyl ethers. *Chromatographia*, 39 (1994) 224-227.
- 309 Chen, C.Y., Liao, C.N. and Tsai, K.H.: (Determination of oxygenates containing TAME in gasolines.) *Shiyou Jikan*, 29, No. 4 (1993) 37-52; C.A., 120 (1994) 327077u.
- 310 Chernyshina, M.A. and Lar'kina M.V.: (Analysis of epichlorhydrin in biologic media by vapor-phase gas chromatography.) *Gig. Sanit.*, 2 (1993) 74-75; C.A., 121 (1994) 2684s.
- 311 Chou, J. and Lu, Y.: (Study on GC analysis of phenyl ether-biphenyl mixture in air.) *Gongye Weisheng Yu Zhiyebing*, 16 (1993) 176-178; C.A., 121 (1994) 162814n.
- 312 Felby, S. and Nielsen, E.: Determination of ketone bodies in postmortem blood by head-space gas chromatography. *Forensic Sci. Int.*, 64 (1994) 83-88; C.A., 121 (1994) 28718f.
- 313 Hanson, M., Kabbara, J. and Junghans, K.: Packed column supercritical fluid chromatography with FID: Investigation of products from copper-catalyzed conjugate additions of trimethylaluminium to α,β -unsaturated aldehydes. *Chromatographia*, 39 (1994) 299-305.
- 314 Katsuoka, M.: (Studies on determination of residual ethylene oxide in medical goods.) *Gijutsu Joho - Shizuka-ken Eisei Kankyo Senta*, 12, No. 1 (1994) 4-7; C.A., 121 (1994) 42693a.
- 315 Mahungu, S.M., Hansen S.W., Steven, L. and Artz, W.E.: Quantitation of volatile compounds in heated triolein by static head-space capillary gas chromatography/infrared spectroscopy-mass spectroscopy. *J. Am. Oil Chem. Soc.*, 71 (1994) 453-455; C.A., 120 (1994) 321744n.
- 316 Namiki, A., Hasegawa, T. and Furukawa, O.: (Studies on the analytical method of aliphatic aldehydes (C₁-C₄) in ambient air by the gas chromatography.) *Nippon Kankyo Eisei Senta Shoho*, 20 (1993) 25-34; C.A., 121 (1994) 140373r.
- 317 Poskrabko, J., Linkiewicz, M. and Jaworski, M.: Analysis of high-boiling ethoxylates of methyl, ethyl, and butyl alcohols with the use of gas chromatography. *Chem. Anal. (Warsaw)*, 39 (1994) 153-159.
- 318 Shi, B., Keogh, R.A. and Davis, B.H.: Gas chromatographic separation of deuterated and optical isomers of di-2-butyl ethers. *J. Chromatogr. A*, 678 (1994) 97-102.
- 319 Teng, Y.: (Determination of acrolein and acrylonitrile in water with purge trap-head space gas chromatography method.) *Huanjing Wuhan Yu Fangzhi*, 15, No. 4 (1993) 40-43; C.A., 121 (1994) 141082g.
- 320 Zenkevich, I.G., Acevedo, J., Aguilera, I. and Giron, V.: (New data on retentoin indexes of aryl diketones, benzoins, furoins, ω -amino ketones, anils, and hydrazones.) *Rev. Cubana Quim.*, 6, No. 2 (1992) 77-88; C.A., 120 (1994) 338049n.
- 321 Zhang, M., Danjou, J. and Rauzy, S.: (Quantification of vanilin formed from lignosulfonate degradation by gas chromatography with FID detection.) *Analisis*, 22 (1994) 287-289; C.A., 121 (1994) 159585h.

See also 15, 40, 197, 212, 283, 649.

10. CARBOHYDRATES

10a. Mono and oligosaccharides. Structural studies

- 322 Beynon, L.M. and Richards, J.C.: Determination of the absolute-configuration of the glycerol component in poly(glycosyl-glycerolphosphates) by GLC-MS. *Carbohydr. Res.*, 252 (1994) 263-268; C.A., 121 (1994) 109492e.
- 323 Chang, L. and Yu, Z.: Microdetermination of monosaccharide in glycoconjugate by capillary gas chromatography with electron capture detector. *Fenxi Ceshi Xuebao*, 12, No. 3 (1993) 53-56; C.A., 120 (1994) 318488b.
- 324 De Koning, A.J.: Determination of myo-inositol and phytic acid by gas chromatography using scyllitol as internal standard. *Analyst (Cambridge)*, 119 (1994) 1319-1323.
- 325 Englyst, H.N., Quigley, M.E. and Hudson, G.J.: Determination of dietary fibre non-starch polysaccharides with gas-liquid chromatographic, high-performance liquid chromatographic or spectrometric measurement of constituent sugars. *Analyst (Cambridge)*, 119 (1994) 1497-1509.
- 326 Higgins, M.K., Bly, R.S. and Morgan, S.L.: Differentiation of isomeric alditol hexaacetates and identification of aldohexoses by electron impact mass spectrometry. *Anal. Chem.*, 66 (1994) 2656-2668.
- 327 Hionidou, T.E.: Carbohydrate identification in mollusk insoluble organic matrix by GC/MS. Avail. *Univ. Microfilms Int.*, Order No. DA9403228, 1993, 298 pp.; C.A., 121 (1994) 129288w.
- 328 Leskovsek, H., Perko, S., Ojgon, D. and Faganeli, J.: Analysis of carbohydrates in marine particulates by gas chromatography and tandem mass spectrometry. *Analyst (Cambridge)*, 119 (1994) 1125-1128.
- 329 Relva, A.M., Chaves Das Neves, H.J. and Ferreira, M.A.: (Lactulose and mannitol determination in urine using gas phase chromatography.) *Rev. Port. Farm.*, 43, No. 4 (1993) 37-41; C.A., 121 (1994) 129038q.
- 330 Shetty, H.U. and Holloway, H.W.: Assay of myo-inositol in cerebrospinal fluid and plasma by chemical ionization mass spectrometry of the hexaacetate derivative. *Biol. Mass. Spectrom.*, 23, No. 7 (1994) 440-444; C.A., 121 (1994) 103563g.

See also 299, 332.

10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides

See 369.

10c. Glycoproteins and their constituents

- 331 Karlsson, H., Karlsson, N. and Hansson, G.C.: High-temperature gas chromatography and gas chromatography-mass spectrometry of glycoprotein and glycosphingolipid oligosaccharides. *Mol. Biotechnol.*, 1 (1994) 165-180; C.A., 121 (1994) 152695k.
- 332 Merkle, R.K. and Poppe, I.: Carbohydrate composition analysis of glycoconjugates by gas-liquid chromatography/mass spectrometry. *Methods Enzymol.*, 230 (1994) 1-15; C.A., 121 (1994) 53411h.

See also 322, 323.

11. ORGANIC ACIDS AND LIPIDS

11a. Organic acids and simple esters

- 333 Amelio, M., Amelotti, G., Cozzoli, O., Faraone, A., Mariani, C., Mattei, A., Marzo, S., Morchio, G., Serani, A. and Spinetti, M.: (Gas chromatographic determination of the trans unsaturated fatty acids in non-hydrogenated oils. Results of a collaborative study.) *Riv. Ital. Sostanze Grasse*, 70 (1993) 561-566; C.A., 121 (1994) 156000c.
- 334 Battistutta, F., Buiatti, S., Zenarola, C. and Zironi, R.: Rapid analysis of free medium-chain fatty acids and related ethyl esters in beer using SPE and HRGC. *J. High Resolut. Chromatogr.*, 17 (1994) 662-664.
- 335 Baykut, S. and Ornektekin, S.: A new method developed for the use of glass beads as supporting material in GLC. II. Separation of fatty acid methyl esters on this new supporting material. *Chim. Acta Turc.*, 21 (1993) 85-93; C.A., 121 (1994) 159672j.
- 336 Bondia, E.M., Castellote, A.I., Lopez, M.C. and Rivero, M.: Determination of plasma fatty acid composition in neonates by gas chromatography. *J. Chromatogr. B*, 658 (1994) 369-374.
- 337 Bordier, C.G., Sellier, N., Foucault, A.P. and Le Goffic, F.: Characterization and purification of fatty acid methyl esters from the liver oil of the deep sea shark (*Centrophorus squamosus*) by gas chromatography-mass spectrometry and countercurrent chromatography. *Chromatographia*, 39 (1994) 329-338.
- 338 Chen, L. and Li, Q.: (Analysis of methyl methacrylate and impurities by capillary gas chromatography.) *Zhejiang Gongxueyuan Xuebao*, 1 (1993) 80-84; C.A., 121 (1994) 110254k.
- 339 Chen, X., Wang, R., Gu, Y., Shen, G. and Tong, D.: Gas chromatography of whole-cell fatty acid in the discrimination of Lactobacilli and Leuconostocs. *Wuxi Qinggongye Xueyuan Xuebao*, 12 (1993) 14-22; C.A., 121 (1994) 30457p.
- 340 Cocito, C. and Delfini, C.: Simultaneous determination by GC of free and combined fatty acids and sterols in grape musts and yeasts as silanized compounds. *Food Chem.*, 50 (1994) 297-305; C.A., 121 (1994) 33478g.
- 341 Djarbusynov, B.U., Mergusheva, N.V. and Shalenkov, B.U.: (Chromatographic measurements of the Krebs' cycle carboxylic acids in ejaculate.) *Klin. Lab. Diagn.*, 6 (1993) 11-13; C.A., 121 (1994) 129033j.
- 342 El-Shabiny, L.M. and McDonough, P.: Analysis of fatty acids of mycoplasma cell. *Vet. Med. J. Giza*, 41, No. 3 (1993) 5-7; C.A., 121 (1994) 30135g.
- 343 Endres, G., Ebel, S. and Haller, B.: (Microdetermination of methacrylic acid esters by GC/MS.) *Arch. Pharm. (Weinheim)*, 8 (1994) 503-507; C.A., 121 (1994) 141903a.
- 344 Fujimori, M., Kajino, K., Kawamura, Y., Ito, Y. and Horitsu, H.: Simultaneous assay of eight preservatives in imported fruit vinegars by solid-phase extraction gas-liquid chromatography. *Nippon Noge Kagaku Kaishi*, 68 (1994) 967-972; C.A., 121 (1994) 33451t.
- 345 Gangoiti, J.A., Alcaraz, C., Bernabé, M., Sanz, J., Jiménez, M.I. and Martínez-Castro, I.: GC separation of the enantiomers of 1-amino-1-cyclopropanecarboxylic acids as their alkyl (N-alkoxy-carbonyl) derivates. *J. High Resolut. Chromatogr.*, 17 (1994) 619-620.

- 346 Guillaume, Y. and Guinchard, C.: Effect of ester molecular structure and column temperature on the retention of eight esters in gas chromatography. *Chromatographia*, 39 (1994) 438-442.
- 347 Haase-Aschoff, I., Haase-Aschoff, K. and Patz, C.-D.: Improved separation of γ - and δ -lactones on a popular phase. *J. High Resolut. Chromatogr.*, 17 (1994) 613-615.
- 348 Hall, L.: Quantitative determination of pivalic acid in dipivefrin containing ophthalmic solutions by gas chromatography. *J. Chromatogr. A*, 679 (1994) 397-401.
- 349 Han, L.M.T. and Szajer, G.: Analysis of epoxidized soybean oil by gas chromatography. *J. Am. Chem. Soc.*, 71 (1994) 660-670; *C.A.*, 121 (1994) 38021n.
- 350 Husain, S., Sarma, P.N. and Sajjad, S.M.: Separation and quantitative determination of reaction mixtures of dimethyl malonate by gas liquid chromatography. *Indian J. Technol.*, 31, No. 7 (1993) 542-544; *C.A.*, 121 (1994) 159683p.
- 351 Ishimata, Y., Mano, N., Oda, Y., Hiyoshi, H., Ikuta, H. and Yoshida, Y.: Simple and sensitive quantitation method for mevalonic acid in plasma using gas chromatography/mass spectrometry. *Rapid Commun. Mass Spectrom.*, 8 (1994) 377-380; *C.A.*, 121 (1994) 30467s.
- 352 Ito, N., Kawasaki, T., Takanashi, T., Mizoguchi, K., Ito, M. and Hayakawa, K.: (Analysis of lower fatty acids in air by gas chromatography using thermal desorption method.) *Aichi-ken Kogai Chosa Senta Shoho*, 21 (1993) 15-19; *C.A.*, 121 (1994) 116339p.
- 353 Jacobsen, S.S., Becker, C.C. and Holmer, G.: A more accurate gas chromatographic method for the analysis of butter fatty acids by estimation of relative response factors. *Chemom. Intell. Lab. Syst.*, 23 (1994) 231-234; *C.A.*, 121 (1994) 7595y.
- 354 Kasukabe, H., Kawamura, K. and Barrie, L.A.: (Determination of water soluble compounds in Arctic aerosols by capillary GC and GC/MS.) *Bunseki Kagaku*, 43 (1994) 837-843.
- 355 Lambertini, P. and Della Casa, G.: Determination of free fatty acid contents and composition of pork fat. *Riv. Ital. Sostanze Grassate*, 71, No.1 (1994) 25-29; *C.A.*, 121 (1994) 81217t.
- 356 Lamberto, M. and Ackman, R.G.: Confirmation by gas chromatography/mass spectrometry of two unusual trans-3-monoethylenic fatty acids from the Nova Scotian seaweeds *Palmaria palmata* and *Chondrus crispus*. *Lipids*, 29 (1994) 441-444.
- 357 Lanchote, V.L., Cardozo dos Santos, A., Queiroz, R.H.C., Tozzato, E. and Carvalho, D.: An improved method for the simultaneous determination of mandelic and phenylglyoxic acids by gas chromatography. *J. Anal. Toxicol.*, 18 (1994) 143-146; *C.A.*, 121 (1994) 2717e.
- 358 Lin, L., Gao, W. and Huang, Y.: (Determination of fatty acids in oil and soap by GC and data process for making soap formulation.) *Riyong Huaxue Gongye*, 3 (1993) 147-150; *C.A.*, 120 (1994) 326187t.
- 359 Lindh, C.H. and Jönsson, B.A.G.: Method for analysis of methyltetrahydrophthalic acid in urine using gas chromatography and selected ion monitoring. *J. Chromatogr. B*, 660 (1994) 57-66.
- 360 Liu, J., Cheng, L., Zhou, F. and Yu, Y.: (Studies on the fatty acids of five midges with gas chromatography.) *Kunchong Xuebao*, 37 (1994) 78-83; *C.A.*, 121 (1994) 54231m.
- 361 Ma, Q., Chang, Z. and Zhang, Z.: (Determination of oxalic acid in Chinese herbal drugs by derivatization-gas chromatography.) *Taiyuan Gongye Daxue Xuebao*, 25 (1994) 108-112; *C.A.*, 121 (1994) 141819c.
- 362 Major, C. and Wolf, B.A.: Quantitation of the fatty acid composition of phosphatidic acid by capillary gas chromatography/electron-capture detection with picomole sensitivity. *J. Chromatogr. B*, 658 (1994) 233-240.
- 363 Metges, C.C., Kempe, K. and Wolfram, G.: Enrichment of selected serum fatty acids after a small oral dosage of (1- ^{13}C)- and (8- ^{13}C)triolein in human volunteers analyzed by gas chromatography/combustion isotope ratio mass spectrometry. *Biol. Mass Spectrom.*, 23 (1994) 295-301; *C.A.*, 121 (1994) 4474x.
- 364 Minero, C., Vincenti, M., Lago, S. and Pelizzetti, E.: Determination of trace amounts of highly hydrophilic compounds in water by direct derivation and gas chromatography-mas spectrometry. *Fresenius J. Anal. Chem.*, 350 (1994) 403-409.
- 365 Mohyuddin, G.: The supercritical fluid extraction and chromatographic analysis of fatty acids in blue cheese. Avail. *Univ. Microfilms Int.*, Order No. DA9411720, 1993, 115 pp.; *C.A.*, 121 (1994) 81472x.
- 366 Nogueira, J.M.F. and Pereira, J.L.C.: Comparison of quantitative methods for analysis of resinic acids in crude Tall-Oil. *Fresenius J. Anal. Chem.*, 350 (1994) 379-383.
- 367 Przyborski, H., Wacha, C. and Bandion, F.: (Determination of D(+)-malic acid in wine.) *Mitt. Klosterneuburg*, 43 (1993) 215-218; *C.A.*, 121 (1994) 33406g.
- 368 Sanchez-Muniz, F.J., Cuesta, C. and Garrido-Polonio, M.C.: Evaluation of a sunflower oil used for frying by different analytical indexes and column and gas chromatography. *Z. Ernährungswiss.*, 33, No. 1 (1994) 16-23; *C.A.*, 121 (1994) 132507x.
- 369 Sanders, P. and Brunt, K.: Improved method for the determination of the total adipyl content in acetylated adipyl crosslinked starches. *Starch/Stärke*, 46 (1994) 255-259; *C.A.*, 121 (1994) 106800t.
- 370 Sera, R.K., McBride, J.H., Higgins, S.A. and Rodgerson, D.O.: Evaluation of reference ranges for fatty acids in serum. *J. Clin. Lab. Anal.*, 8 (1994) 81-85; *C.A.*, 120 (1994) 318505e.
- 371 Shao, X. and Zhang, Y.: Determination of (E)-10-hydroxy-2-decylenic acid in therapeutic royal jelly by GC and HPLC. *Zhongcaoyao*, 25, No. 4 (1994) 192-208; *C.A.*, 121 (1994) 117865u.
- 372 Shen, Y., Wang, Q., Zhu, D. and Zhou, L.: Retention behavior of carboxylic acid methyl esters in supercritical fluid chromatography. *Chin. J. Chem.*, 12 (1994) 129-137; *C.A.*, 120 (1994) 331891x.
- 373 Stan'kov, I.A., Beresnev, A.N. and Lanin, S.N.: (Gas chromatographic determination of organic acids in a medium of oleum of sulfuric acid.) *Zh. Anal. Khim.*, 49 (1994) 437-440.
- 374 Sun Dingyi, Cheng Chaoren, Wang Honglei and Li Kaisheng: (Study on the chemical constituents of the solid blocks formed in the production of CCl_4 by gas chromatography-mass spectrometry (GC-MS).) *Chin. J. Chromatogr.*, 12 (1994) 263-264.
- 375 Tambe, A.S., Biswas, S.S. and Zubaidha, P.K.: Gas chromatographic analysis of diastereomers and enantiomers of β,γ -unsaturated esters and various analogues of butenolides including mint and isomint lactone and comparison with the high-performance liquid chromatographic analysis of their diastereomers. *J. Chromatogr. A*, 683 (1994) 397-401.

- 376 Tanaka, I., Kadota, Y., Ohtsu, Y. and Yamaguchi, M.: (Purification of docosahexaenoic acid using silver-loaded spherical ceramics by supercritical fluid chromatography.) *Kuromatogurai*, 14, No. 5 (1993) 48-49; C.A., 121 (1994) 33651h.
- 377 Tomita, Y. and Yamanaka, S.: Determination of fatty acid composition in rat plasma by a new microanalytical method. *Bull. Tokyo Dent. Coll.*, 35 (1994) 1-7; C.A., 121 (1994) 152445d.
- 378 Ulberth, F.: Detection of milk fat adulteration by linear discriminant analysis of fatty acid data. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1326-1334.
- 379 Wang Xiuhong, Jia Chongrong and Ou Qingyu: (The direct enantiomeric separation of optically active γ -lactones in foods by multidimensional gas chromatography.) *Chin. J. Chromatogr.*, 12 (1994) 313-316.
- 380 Xu Zichao, Li Xiaoye, Jiang Jinxia and Yin Yun: (Determination of the concentration of free fatty acids in the plasma of patients with malignant hematopoietic diseases by gas chromatography.) *Chin. J. Chromatogr.*, 12 (1994) 268-269.
- 381 Xu, L.: (Series organic support GC column in determination of ethyl acetate and fusel oil in alcoholic beverages.) *Zhonghua Yufang Yixue Zazhi*, 27 (1993) 238-240; C.A., 121 (1994) 7546h.
- 382 Zhang, S. and Chang, L.: (Determination of fatty acids in various phospholipids from erythrocyte membrane.) *Fenxi Huaxue*, 22 (1994) 346-350; C.A., 121 (1994) 30147n.
- 383 Zhang, S. and Chang, L.: (Determination of very long chain fatty acids in plasma by capillary gas chromatography.) *Gaodeng Xuexiao Huaxue Xuebao*, 15 (1994) 364-366; C.A., 121 (1994) 30161n.
- 384 Zheng, L., Wang, L. and Jiang, K.: Determination of eicosapentaenoic acid and docosahexanoic acid in fish oil by gas chromatography-Fourier transform infrared spectrometry. *Fenxi Huaxue*, 22, No. 4 (1994) 383-385; C.A., 121 (1994) 117859v.
- See also 130, 272, 291, 299, 385.
- 11c. Lipids and their constituents**
- 385 Cardenas, M.S., Ballersteros, E., Callego, M. and Valcarcel, M.: Sequential determination of triglycerides and free fatty acids in biological fluids by use of a continuous pretreatment module coupled to a gas chromatograph. *Anal. Biochem.*, 222 (1994) 332-341.
- 386 Elenkov, I.J., Ivanova, A.P., Stefanov, K.L., Seizova, K.A. and Popov, S.S.: A quantitative determination of lipid classes in higher plants and algae by gas-chromatographic procedure. *Bulg. Chem. Commun.*, 26 (1993) 98-103; C.A., 121 (1994) 152438d.
- 387 Huijberts, G.N.M., van der Wal, H., Wilkinson, C. and Eggink, G.: Gas-chromatographic analysis of poly(3-hydroxyalkanoates) in bacteria. *Biotechnol. Tech.*, 8 (1994) 187-192; C.A., 121 (1994) 30132d.
- 388 Molkentin, J. and Precht, D.: Comparison of packed and capillary columns for quantitative gas chromatography of triglycerides in milk fat. *Chromatographia*, 39 (1994) 265-270.
- 389 Staby, A., Borch-Jensen, C., Balchen, S. and Mollerup, J.: Supercritical fluid chromatographic analysis of fish oil. *J. Am. Oil Chem. Soc.*, 71 (1994) 355-359; C.A., 120 (1994) 321615w.
- 390 Takahashi, K. and Hirano, T.: Theoretical aspects of the chromatographic behavior of *cis-trans* isomers and omega isomers of lipids in polar stationary phase gas liquid chromatography and in reverse phase high performance liquid chromatography. *Hokkaido Daigaku Suisangakubu Kenkyu Iho*, 44 (1993) 209-219; C.A., 120 (1994) 318479z.
- See also 195, 644.
- 11d. Lipoproteins and their constituents**
- 391 Kheifets, G.M., Alekseeva, E.M. and Vendik, O.O.: (Gas chromatographic microdetermination of blood plasma glycerophosphatides without their preseparation from a lipid extract.) *Zh. Anal. Khim.*, 49 (1994) 530-537.
- See also 362, 382.
- 12. ORGANIC PEROXIDES**
- See 428.
- 13. STEROIDS**
- 13b. Pregnane and androstane derivatives**
- 392 Debruyckere, G., de Sagher, R., van Peteghem, C., van Vyncht, G., Maghuin-Rogister, G. and de Pauw, E.: Gas chromatographic-mass spectrometric confirmation of a clostebol metabolite in urine. *Anal. Chim. Acta*, 291 (1994) 155-160.
- 393 Gachancard-Bouya, J.-L. J. and Begue, R.-J.: Urinary steroids from a newborn human infant. Identification of 2α -hydroxy-4-pregnene-3,20-dione, $3\beta,15\beta$ -dihydroxy-5-pregnen-20-one and $3\beta,15\alpha$ -dihydroxy-5-pregnen-20-one. *J. Steroid Biochem. Mol. Biol.*, 49 (1994) 213-226; C.A., 121 (1994) 100005r.
- 394 Rossi, S.-A., Johnson, J.V. and Yost, R.A.: Short-column gas chromatography/tandem mass spectrometry for the detection of underivatized anabolic steroids in urine. *Biol. Mass Spectrom.*, 23, No. 3 (1994) 131-139; C.A., 121 (1994) 28709d.
- 395 Van Vyncht, G., Gaspar, P., DePauw, E. and Maghuin-Rogister, G.: Multi-residue screening and confirmatory analysis of anabolic steroids in urine by gas chromatography coupled with tandem mass spectrometry. *J. Chromatogr. A*, 683 (1994) 67-74.
- 396 Varelis, P., Smythe, G.A., Hodgson, D. and Lazarus, L.: Measurement of urinary free cortisol by stable isotope dilution mass spectrometry using a new cortisol derivative. *J. Chromatogr. B*, 660 (1994) 151-157.
- 397 Zhou, J. and Wang, Y.: (Determination of non-derivative androgen by capillary gas chromatography.) *Hebei Daxue Xuebao, Ziran Kexueban*, 14, No. 2 (1994) 83-86; C.A., 121 (1994) 125427t.
- See also 270.

13c. Estrogens

- 398 Sepkovic, D.W., Bradlow, H.L., Michnowicz, J., Murtezani, S., Levy, I. and Osborne, M.P.: Catechol estrogen production in rat microsomes after treatment with indole-3-carbinol, ascorbigen, or β -naphthoflavone: a comparison of stable isotope dilution gas chromatography-mass spectrometry and radiometric methods. *Steroids*, 59 (1994) 318-323; C.A., 121 (1994) 26429p.

13d. Sterols

- 399 Bortolomeazzi, R., Pizzale, L., Conte, L.S. and Lercker, G.: Identification of thermal oxidation products of cholesterol acetate. *J. Chromatogr. A*, 683 (1994) 75-85.
- 400 Maurice, D.V., Lightsey, S.F., Hsu, K.T., Gaylord, T.G. and Reddy, R.V.: Cholesterol in eggs from different species of poultry determined by capillary GLC. *Food Chem.*, 50 (1994) 367-372; C.A., 121 (1994) 106799z.
- 401 Molnar, J., Piretti, M.V. and Molnar, P.: (Investigation of the sterol fraction of olive oil by gas chromatography-mas spectrometry.) *Elelmiszervizsgalati Kozl.*, 40 (1994) 9-16; C.A., 121 (1994) 7756b.
- 402 Movsumov, I.S., Aliev, A.M., Belov, B.I. and Belov, A.B.: (Gas-chromatographic determination of tocopherols in olive oil.) *Farmatsiya (Moscow)*, 42, No. 1 (1993) 52-54; C.A., 121 (1994) 156187u.
- 403 Nota, G., Naviglio, D., Romano, R., Sacchi, R., Spagna Musso, S. and Impronta, C.: (Gas chromatographic evaluation of β -sitosterol, stigmasterol and trienanthin as denaturants of anhydrous butters.) *Riv. Ital. Sostanze Grasse*, 70 (1993) 605-608; C.A., 121 (1994) 81207g.
- 404 Plank, C. and Lorbeer, E.: On-line liquid chromatography-gas chromatography for the analysis of free and esterified sterols in vegetable oil methyl esters used as diesel fuel substitutes. *J. Chromatogr. A*, 683 (1994) 95-104.

See also 340, 637.

13e. Bile acids and alcohols

- 405 Scalia, S., Cova, U., Fogagnolo, M., Landi, S. and Medici, A.: Determination of free bile acids in raw materials and bulk products by HPLC and GC. *Anal. Lett.*, 27 (1994) 1789-1804.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. Terpenes

- 406 Combariza, M.Y., Tirado, C.B., Stashenko, E. and Shibamoto, T.: Limonene concentration in lemon (*Citrus volkameriana*) peel oil as a function of ripeness. *J. High Resolut. Chromatogr.*, 17 (1994) 643-646.
- 407 Ravid, U., Putievski, E. and Katzir, I.: Chiral GC analysis of menthone and isomenthone with high enantiomeric purities in laboratory-made and commercial essential oils. *Flavour Fragrance J.*, 9 (1994) 139-142; C.A., 121 (1994) 141180n.

- 408 Steinbrecher, R., Eichstädt, G., Schürmann, E., Torres, L., Clement, B., Simon, V., Kotzias, D., Daiber, R. and van Eijk, J.: Monoterpenes in air samples: European intercomparison experiments. *Intern. Environ. Anal. Chem.*, 54 (1994) 283-297.
- 409 Wang, Q., Yang, X. and Chen, J.: (Identification and analysis of borneol.) *Zhongcaoyao*, 25 (1994) 241-244; C.A., 121 (1994) 141821x.

See also 85, 148.

15b. Essential oils

- 410 Adasoglu, N., Dineler, S. and Bolat, E.: Supercritical-fluid extraction of essential oil from Turkish lavender flowers. *J. Supercrit. Fluids*, 7 (1994) 93-99.
- 411 Brunke, E.-J., Hammerschmidt, F.-J. and Schmaus, G.: Headspace analysis of hyacinth flowers. *Flavour Fragrance J.*, 9, No. 2 (1994) 59-69; C.A., 121 (1994) 117287g.
- 412 Buchbauer, G., Jirovecz, L., Wasicky, M. and Nikiforov, A.: Volatile constituents of *Excavum affine* Balf. flowers obtained by dynamic headspace sampling and as the essential oil. *Flavour Fragrance J.*, 9, No. 2 (1994) 55-58; C.A., 121 (1994) 117286f.
- 413 Chang, L., Qiu, J., Luo, G., Sheng, L. and An, D.: (Database management system (DBMS) of essential oil and essence by capillary column gas chromatography.) *Jisuanji Yu Yingyong Huaxue*, 10 (1993) 313-314; C.A., 121 (1994) 34384k.
- 414 El-Sherei, M.M.: GC-MS analysis of the essential oil of *Cosmos bipinnatus* Cav. growing in Egypt. *Zagazig J. Pharm. Sci.*, 1 (1992) 120-127; C.A., 120 (1994) 330783b.
- 415 Jin, Z., Qu, Y. and Lin, Y.: (Gas chromatographic retention index of volatile component of nutgrass rhizome (*Cyperus rotundus*)) *Zhongcaoyao*, 25 (1994) 12-16; C.A., 120 (1994) 319450v.
- 416 Kamel, A. and Sandra, P.: Gas chromatography-mass spectrometry analysis of the volatile oils of two *Teucrium polium* varieties. *Biochem. Syst. Ecol.*, 22, No. 5 (1994) 529-532; C.A., 121 (1994) 163670z.
- 417 Liu, Y. and Tan, H.: (GC-MS analysis of essential oils from roots and vines of *Aristolochia* and their allied drugs.) *Zhongguo Zhongyao Zaishi*, 19, No. 1 (1994) 34-36; C.A., 121 (1994) 65658g.
- 418 Mondello, L., Bartle, K.D., Dugo, P. and Gans, P.: Automated LC-GC: a powerful method for essential oils analysis. Part IV. Coupled LC-GC-MS (ITD) for bergamot oil analysis. *J. Microcolumn Sep.*, 6 (1994) 237-244.
- 419 Ochocka, R.J., Asztemborska, M., Kowalczyk, J. and Lamparczyk, H.: Gas chromatographic evaluation of essential oils supported by principal component analysis. *Pharmazie*, 49 (1994) 287-288; C.A., 121 (1994) 42388e.
- 420 Taylor, S.L., King, J.W. and Snyder, J.M.: Tandem supercritical fluid extraction/chromatographic studies of the desert botanical species, *Dalea spinosa*. *J. Microcolumn Separ.*, 6 (1994) 467-473.
- 421 Tazerouti, F., Badjah-Hadj-Ahmed, A.Y., Meklati, B.Y., Favre-Bonvin, J. and Bobenrieth, M.J.: (Analysis of essential oils from the leaves of *Pinus halepensis* by GC-MS.) *Plant. Med. Phytother.*, 26, No. 3 (1993) 161-176; C.A., 121 (1994) 42373w.

- 422 Wang, X., Liao, G. and Hou, S.: Determination of the contents of bufadienolide and borneol in Liushenwan. *Zhongguo Zhongyao Zazhi*, 19, No. 1 (1994) 25-27; C.A., 121 (1994) 331245q.
- 423 Wang, Y. and Wang, H.: Analysis of chemical constituents of essential oil from Dachengqi decoction. *Zhongguo Zhongyao Zazhi*, 19 (1994) 93-95; C.A., 121 (1994) 18164h.
- 424 Wei, Y., An, Z., Zhang, Z. and Liu, Y.: Analysis of constituents of volatile oil of Chinese silvery ginseng by gas chromatography-mass spectrometry. *Fenxi Huaxue*, 22 (1994) 308-310; C.A., 121 (1994) 17801b.
- 425 Zhang, J., Lu, D., Lin, Z. and Chen, C.: (Analysis of Xinjiang cumin oil by gas chromatography combined with infrared and mass spectrometry.) *Shanghai Keji Daxue Xuebao*, 16 (1993) 177-181; C.A., 120 (1994) 321700v.
- 426 Zhang, L., Rashid, A., Zhang, Z. and An, D.: (Gas chromatographic determination of menthol and borneol in Zhenjiang plaster.) *Zhongguo Yaoke Daxue Xuebao*, 25, No. 1 (1994) 24-25; C.A., 120 (1994) 331238q.
- 427 Zou, D., Su, X. and Wu, A.: (Gas chromatographic determination of eugenol in *Ocimum gratissimum* cream.) *Zhongguo Yiyuan Yaoxue Zazhi*, 14 (1994) 19-20; C.A., 120 (1994) 331227k.

See also 406, 633, 648

16. NITRO AND NITROSO COMPOUNDS

- 428 Blanchard, P.: Development of a gas chromatograph for trace level measurement of peroxyacetyl nitrate (PAN) using chemical amplification. *Avail NLC*, Order No. DANN84189, 1993, 158 pp.; C.A., 121 (1994) 116329k.
- 429 De Kock, A.C. and Anderson, C.R.: The measurement of C₃-C₅ alkyl nitrates at a coastal sampling site in the southern hemisphere. *Chemosphere*, 29 (1994) 299-310.
- 430 Fine, D.H., Rounbehler, D.P. and Goff, U.: Determination of airborne nitrosamines by means of air-sampling cartridges and GC-TEA. *Sci. Publ.*, 109 (1993) 269-274; C.A., 120 (1994) 32995Sc.
- 431 Horng, J.-Y. and Huang, S.-D.: Determination of the semi-volatile compounds nitrobenzene, isophorone, 2,4-dinitrotoluene and 2,6-dinitrotoluene in water using solid-phase microextraction with a polydimethylsiloxanecoated fibre. *J. Chromatogr. A*, 678 (1994) 313-318.
- 432 Luxenhofer, O. and Ballschmiter, K.: C₄-C₁₄-Alkyl nitrates as organic trace compounds in air. *Fresenius J. Anal. Chem.*, 350 (1994) 395-402.
- 433 Luxenhofer, O., Schneider, R. and Ballschmiter, K.: Separation, detection and occurrence of (C₂-C₆)-alkyl- and phenyl-alkyl nitrates as trace compounds in clean and polluted air. *Fresenius J. Anal. Chem.*, 350 (1994) 384-394.
- 434 Ma Mingsheng and Xu Xiaobai: (The retention characteristics of heptafluorobutyric anhydride derivatives of the reduced products from nitro-polycyclic aromatic hydrocarbons.) *Chin. J. Chromatogr.*, 12 (1994) 238-240.

- 435 Sen, N.P., Baddoo, P.A., Weber, D. and Boyle, M.: A sensitive and specific method for determination of N-nitrosodimethylamine in drinking water and fruit drinks. *Intern. J. Environ. Anal. Chem.*, 56 (1994) 149-163.
- 436 Sommer, C.: (Gas chromatographic determination of nitro musk compounds in cosmetics and detergents.) *Dtsch. Lebensm.-Rundsch.*, 89 (1994) 108-111; C.A., 121 (1994) 42368y.

See also 242, 693

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. Amines and polyamines

- 437 Bryant, M.S., Skipper, P.L., Wishnok, J.S., Stillwell, W.G., Glogowski, J.A. and Tannenbaum, S.R.: Determination of hemoglobin adducts of aromatic amines by gas chromatography-mass spectrometry. *IARC Sci. Publ.*, 109 (1993) 281-292; C.A., 121 (1994) 2701v.

See also 438, 710.

17b. Catecholamines and their metabolites

- 438 Baker, G.L., Coutts, R.T. and Holt, A.: Derivatization with acetic anhydride: applications to the analysis of biogenic amines and psychiatric drugs by gas chromatography and mass spectrometry. *J. Pharmacol. Toxicol. Methods*, 31 (1994) 141-148; C.A., 121 (1994) 148130e - a review with 70 refs.

17d. Other amine derivatives and amides (excl. peptides)

- 439 Hu, H., Wang, Y. and Chen, B.: (Test method for triethylamine content in atmosphere.) *Shanghai Huagong*, 19, No. 2 (1994) 11-14; C.A., 121 (1994) 140361k.
- 440 Jing, S., Yu, Z. and Zhou, H.: Determination of tetramine in postmortem specimens by GC-NPD. *J. Anal. Toxicol.*, 18 (1994) 275-277; C.A., 121 (1994) 150679j.
- 441 Suzuki, S., Amemiya, T., Itoh, K. and Nakamura, H.: (Determination of alkyltrimethylammonium chlorides in cosmetics by injection port pyrolysis gas chromatography.) *Jpn. J. Toxicol. Environ. Health*, 40 (1994) 147-153; C.A., 121 (1994) 65274d.

See also 702.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. Amino acids and their derivatives

- 442 Braga de Moraes, Z., Vasconcelos, A.M.P. and Chaves das Neves, J.: Recovery of amino acids from resin- and silica-bonded cation exchangers in sample preparation for HRGC. *J. High Resolut. Chromatogr.*, 17 (1994) 735-738.

- 443 Brückner, H. and Westhauser, T.: Chromatographic determination of D-amino acids as native constituents of vegetables and fruits. *Chromatographia*, 39 (1994) 419-426.
- 444 Brückner, H., Haasman, S. and Friedrich, A.: Quantification of D-amino acids in human urine using GC-MS and HPLC. *Amino Acids*, 6 (1994) 205-211; C.A., 121 (1994) 152698p.
- 445 Kumps, A., Duez, P. and Mardens, Y.: Gas chromatographic profiling and determination of urinary acylcarnitines. *J. Chromatogr. B*, 658 (1994) 241-248.
- 446 Lowes, S.: Development of gas chromatography/mass spectrometry analysis of urinary acylcarnitines: application to metabolism studies in humans. Avail. *Univ. Microfilms Int.*, Order No. BRDX95808, 1991, 257 pp.; C.A., 120 (1994) 318769u.
- 447 Márquez, C.D., Weintraub, S.T. and Smith, P.C.: Femtomole detection of amino acids and dipeptides by gas chromatography-negative-ion chemical ionization mass spectrometry following alkylation with pentafluorobenzyl bromide. *J. Chromatogr. B*, 658 (1994) 213-221.
- 448 Nobile, L., Raggi, M.A. and Bugamelli, F.: Conductometric titration and gas chromatographic analysis of ketoprofen salts in pharmaceutical formulations. *Farmaco*, 40 (1993) 1569-1576; C.A., 121 (1994) 18187t.
- 449 Ruttkat, A. and Erbersdobler, H.F.: Degradation of furosine during heptafluorobutyric anhydride derivatization for gas chromatographic determination. *J. Chromatogr. A*, 678 (1994) 103-107.
- 450 Vatankhah, M. and Moini, M.: Characterization of fluorinated ethylchloroformate derivatives of protein amino acids using positive and negative chemical ionization gas chromatography/mass spectrometry. *Biol. Mass Spectrom.*, 23 (1994) 277-282; C.A., 121 (1994) 4311s.

See also 84, 101.

18b. Peptides, peptidic and proteinous hormones, growth factors

See 447.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

21a. Purines, pyrimidines, nucleosides, nucleotides

- 451 Chaudhary, A.K., Nokubo, M., Marnett, L.J. and Blair, I.A.: Analysis of the malondialdehyde-2'-deoxyguanosine adduct in rat liver DNA by gas chromatography/electron capture negative chemical ionization mass spectrometry. *Biol. Mass Spectrom.*, 23 (1994) 457-464; C.A., 121 (1994) 150641r.
- 452 O'Donoghue, K., Brown, T.A., Carter, J.F. and Evershed, R.P.: Detection of nucleotide bases in ancient seeds using gas chromatography/mass spectrometry and gas chromatography/mass spectrometry/mass spectrometry. *Rapid Commun. Mass Spectrom.*, 8 (1994) 503-508; C.A., 121 (1994) 133150n.
- 453 Simek, P., Jegorov, A. and Dubák F.: Determination of purine bases and nucleosides by conventional and microbore high-performance liquid chromatography and gas chromatography with an ion-trap detector. *J. Chromatogr. A*, 679 (1994) 195-200.

21c. Nucleic acids, DNA

See 451.

22. ALKALOIDS

- 454 Mossoba, M.M., Lin, H.S., Andrzejewski, D., Sphon, J.A., Betz, J.M., Miller, L.J., Eppley, R.M., Trucksess, M.W. and Page, S.W.: Application of gas chromatography/matrix isolation/Fourier transform infrared spectroscopy to the identification of pyrrolizidine alkaloids from Comfrey root (*Symphytum officinale* L.). *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1167-1174.

See also 584.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23c. Indole derivatives and plant hormones (gibberellins)

- 455 Mortiz, T. and Monteiro, A.M.: Analysis of endogenous gibberellins and gibberellin metabolites from *Dalbergia dolichopetala* by gas chromatography-mass spectrometry. *Planta*, 193 (1994) 1-8; C.A., 120 (1994) 319376a.

23d. Pyridine derivatives

- 456 Allen, D.W., Clench, M.R. and Morris, J.: Investigation of the products of oxidation of methylpyridines under aqueous conditions by gas chromatography-mass spectrometry. *Analyst (Cambridge)*, 119 (1994) 903-907.
- 457 Brunnermann, K.D.: Determination of nicotine and minor tobacco alkaloids in indoor air by absorption and gas chromatography. *IARC Sci. Publ.*, 109 (1993) 275-280; C.A., 120 (1994) 329956d.
- 458 Husain, S., Sarma, P.N. and Swami, G.Y.S.K.: Thermodynamic properties of chloropyridine isomers by gas liquid chromatography using OV-17 and DEGA stationary phases. *Indian J. Chem. Toxicol.*, 1 (1994) 118-120; C.A., 121 (1994) 142905q.

23e. Other N-heterocyclic compounds

- 459 Hernández, C.V. and Rutledge, D.N.: Multivariate statistical analysis of gas chromatograms to differentiate cocoa masses by geographical origin and roasting conditions. *Analyst (Cambridge)*, 119 (1994) 1171-1176.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 460 Auger, J. and Feray, S.: First results in trace identification of allelochemicals and pheromones by combining gas chromatography-mass spectrometry and direct deposition gas chromatography-Fourier transform infrared spectrometry. *J. Chromatogr. A*, 683 (1994) 87-94.

- 461 Boberg, F., Bruns, W. and Musshoff, D.: (Sulfur compounds in crude oil. Part XXI. Gas chromatographic studies of alkylbenzothiophene and alkylbenzothiophene-5,5-dioxides.) *Erdöl Kohle Erdgas Petrochem.*, 47 (1994) 187-191; C.A., 121 (1994) 38788t.
- 462 Brown, P.D., Morra, M.J. and Borek, V.: Gas chromatography of allelochemicals produced during glucosinolate degradation in soil. *J. Agric. Food Chem.*, 42 (1994) 2029-2034.
- 463 Davidson, B.M. and Allen, A.G.: A method for sampling dimethyl sulfide in polluted and remote marine atmospheres. *Atmos. Environ.*, 28 (1994) 1721-1729; C.A., 121 (1994) 90265j.
- 464 Deruaz, D., Soussan-Marchal, F., Joseph, I., Desage, M., Bannier, A. and Brazier, J.L.: Analytical strategy by coupling headspace gas chromatography, atomic emission spectrometric detection and mass spectrometry. Applications to sulfur compounds from garlic. *J. Chromatogr. A*, 677 (1994) 345-354.
- 465 Louter, A.J.H., Rinkema, F.D., Ghijssen, R.T. and Brinkman U.A.T.: Rapid identification of benzothiazole in river water with on-line solid-phase extraction-gas chromatography-mass selective detection. *Intern. J. Environ. Anal. Chem.*, 56 (1994) 49-56.
- 466 Meiring, H.D. and de Jong, A.P.J.M.: Determination of ethylenethiourea in water by single-step extractive derivatization and gas chromatography-negative ion chemical ionization mass spectrometry. *J. Chromatogr. A*, 683 (1994) 156-165.
- 467 Misharina, T.A. and Golovnya, R.V.: (Spectral and gas-chromatographic characterization of 4-methyl-2-alkyl substituted 1,3-oxathiolanes and 1,3-dithiolanes.) *Zh. Anal. Khim.*, 49 (1994) 395-401.
- 468 Saito, I., Yamada, S., Oshima, H., Ikai, Y., Oka, H. and Hyakawa, J.: Analysis of methyl isothiocyanate in wine by gas chromatography with dual detection. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1296-1299.
- 469 Sakamoto, K., Hirota, Y., Nezu, T., Kimijima, K. and Okuyama, M.: (Determination of tire tread pyrolyzates thiophenes in suspended particulate matter.) *Taiki Osen Gakkaishi*, 29, No. 1 (1994) 9-15; C.A., 120 (1994) 329938z.
- 470 Yoshida, M., Sumimoto, T., Yoshida, A. and Nishimune, T.: (Determination of methyl isothiocyanate from wine by gas chromatography.) *Osaka-furitsu Koshu Eisei Kenkyusho Kenkyu Hokoku Shokuhin Eisei Hen*, 24 (1993) 61-66; C.A., 120 (1994) 321598t.
- See also 40, 306, 543, 561.
- 25 ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)
- 471 De Geus, H., Zegers, B.N., Lingeman, H. and Brinkman, U.A.T.: Determination of trialkyl and triaryl phosphates in sediment using microwave extraction and packed-capillary supercritical fluid chromatography. *Intern. J. Environ. Anal. Chem.*, 56 (1994) 119-132.
- 472 Kudzin, Z.H., Sochacki, M. and Drabowicz, J.: Carbocyclic anhydrides-orthoesters-novel reagent systems for derivatization of aminoalkanephosphonic acids for characterization by gas chromatography and mass spectrometry. III. *J. Chromatogr. A*, 678 (1994) 299-312.
- 473 Söderström, M.T. and Ketola, R.: Identification of nerve agents and their homologues and dialkyl methylphosphonates by gas chromatography/Fourier transform infrared spectrometry (GC-FTIR). Part 1.: Spectral interpretation. *Fresenius J. Anal. Chem.*, 350 (1994) 162-167.
- 474 Zou Yuping and Liu Zhaojie: (The chemical derivatization of o-alkyl phosphonyl dichloride in gas chromatographic analysis.) *Chin. J. Chromatogr.*, 12 (1994) 283-284.
- See also 527, 680.
26. ORGANOMETALLIC AND RELATED COMPOUNDS
- 26a. Organometallic compounds
- 475 Aggarwal, S.K., Kinter, M. and Herold, D.A.: Mercury determination in blood by gas chromatography-mass spectrometry. *Biol. Trace Elem. Res.*, 41 (1994) 89-102; C.A., 121 (1994) 101361r.
- 476 Bayona, J.M. and Cai, Y.: The role of supercritical fluid extraction and chromatography in organotin speciation studies. *TrAC*, 13 (1994) 327-332.
- 477 Blake, E., Raynor, M.W. and Cornell, D.: Determination of organotin compounds by capillary supercritical fluid chromatography with inductively coupled plasma mass spectrometric detection. *J. Chromatogr. A*, 683 (1994) 223-231.
- 478 Byrdy, F.A. and Caruso, J.A.: Elemental analysis of environmental samples. Using chromatography coupled with plasma mass spectrometry. *Environ. Sci. Technol.*, 28 (1994) 528A-534A - a review with 53 refs.
- 479 Carro-Díaz, A.M., Lorenzo-Ferreira, R.A. and Cela-Torrijos, R.: Speciation of organomercurials in biological and environmental samples by gas chromatography with microwave-induced plasma atomic emission detection. *J. Chromatogr. A*, 683 (1994) 245-252.
- 480 Dirkx, W.M.R., de la Calle, M.B., Ceulemans, M. and Adams, F.C.: Speciation of butyltin compounds in sediments using gas chromatography interfaced with quartz furnace atomic absorption spectrometry. *J. Chromatogr. A*, 683 (1994) 51-58.
- 481 Feldmann, J., Grümpling, R. and Hirner, A.V.: Determination of volatile metal and metalloid compounds in gases from domestic waste deposits with GC/ICP-MS. *Fresenius J. Anal. Chem.*, 350 (1994) 228-234.
- 482 Liu, Y., Lopez-Avila, V. and Alcaraz, M.: Off-line complexation/supercritical fluid extraction and gas chromatography with atomic emission detection for the determination and speciation of organotin compounds in soils and sediments. *Anal. Chem.*, 66 (1994) 3788-3796.
- 483 Ohfuji, M., Kamada, I., Chatani, Y., Tsutsui, T. and Adachi, T.: (Simultaneous determination of organotin compounds in fish and shellfish by capillary GC.) *Kyoto-fu Eisei Kogai Kenkyusho Nenpo*, 38 (1993) 12-22; C.A., 121 (1994) 156113s.
- 484 Ombaba, J.M. and Barry, E.F.: Determination of (methylcyclopentadienyl)manganese carbonyl in gasoline by capillary gas chromatography with alternating current plasma emission detection. *J. Chromatogr. A*, 678 (1994) 319-325.

- 485 Tutschku, S., Mothes, S. and Dittrich, K.: Determination and speciation of organotin compounds by gas chromatography-microwave induced plasma atomic emission spectrometry. *J. Chromatogr. A*, 683 (1994) 269-276.

See also 133, 550.

26b. Boranes, silanes and related non-metallic compounds

- 486 Bai, W., Deng, B. and Cai, X.: Study on the CGC/AAS and analysis of the species of trace selenium in garlic oil. *Fenxi Shiyanshi*, 13, No. 1 (1994) 9-12; C.A., 121 (1994) 92022b.
- 487 Ballin, U., Kruse, R. and Rüssel, H.A.: Determination of total arsenic and speciation of arsenic-betaine in marine fish by means of reaction-headspace gas chromatography utilizing flame-ionisation detection and elemental specific spectrometric detection. *Fresenius J. Anal. Chem.*, 350 (1994) 54-61.
- 488 Blaszó, M.: Pyrolysis-gas chromatography-mass spectrometry of poly(dialkylsilylenes). *J. Chromatogr. A*, 683 (1994) 115-124.
- 489 Just, U., Mellor, F. and Keidel, F.: Supercritical fluid chromatography-mass spectrometry and matrix-assisted laser-desorption ionization mass spectrometry of cyclic siloxanes in technical silicone oils and silicone rubbers. *J. Chromatogr. A*, 683 (1994) 105-113.

See also 48.

26c. Coordination compounds

- 490 Kumar, M.: Recent trends in chromatographic procedures for separation and determination of rare earth elements. A review. *Analyst (Cambridge)*, 119 (1994) 2013-2024 - a review with 210 refs.
- 491 Laintz, K.E., Iso, S., Meguro, Y., and Yoshida, Z.: A brief study of the supercritical fluid chromatographic behavior of lanthanide β -diketonates. *J. High Resolut. Chromatogr.*, 17 (1994) 603-606.
27. VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- 492 Pfander, H., Riesen, R. and Niggli, U.: HPLC and SFC of carotenoids - scope and limitations. *Pure Appl. Chem.*, 66 (1994) 947-954; C.A., 121 (1994) 77516x - a review with 36 refs.
- 493 Thienpont, L.M., de Brabandere, V.L., Stoeckl, D. and de Leenheer, A.P.: Development of a new method for the determination of thyroxine in serum based on isotope dilution gas chromatography mass spectrometry. *Biol. Mass Spectrom.*, 23 (1994) 475-482; C.A., 121 (1994) 125445x.
- 494 Wilson, R.T., Wong, J., Johnston, J., Epstein, R. and Heller, D.N.: Confirmation of leucogentian violet in chicken fat by gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1137-1142.
- 495 Yarita, T., Nomura, A., Abe, K. and Takeshita, Y.: Supercritical fluid chromatographic determination of tocopherols on an ODS-silica gel column. *J. Chromatogr. A*, 679 (1994) 329-334.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

- 496 Barcelo, D.: Official methods of analysis of priority pesticides in water using gas chromatographic techniques. *Tech. Instrum. Anal. Chem.*, 13 (1993) 149-180; C.A., 121 (1994) 17114e - a review with 67 refs.
- 497 Barceló, D., Chiron, S., Lacorte, S., Martinez, E., Salau, J.S. and Hennion, M.-C.: Solid-phase sample preparation and stability of pesticides in water using empose disks. *TrAC*, 13 (1994) 352-360.
- 498 Brinkman, U.A.T., Slobodnik, J. and Vreuls, J.J.: Trace-level detection and identification of polar pesticides in surface water: the SAMOS approach. *TrAC*, 13 (1994) 373-381.
- 499 Dreyfuss, M.F., Lofti, H., Marquet, P., Debord, J., Daguet, J.L. and Lachatre, G.: (Pesticide residue determination in honey and apples by HPLC and GC.) *Analisis*, 22 (1994) 273-280; C.A., 121 (1994) 132532b.
- 500 Eisert, R., Levsen, K. and Wünsch, G.: Element-selective detection of pesticides by gas chromatography-atomic emission detection and solid-phase microextraction. *J. Chromatogr. A*, 683 (1994) 175-183.
- 501 Haraguchi, K., Kitamura, E., Yamashita, T. and Kido, A.: Simultaneous determination of trace pesticides in urban air. *Atmos. Environ.*, 28, No. 7 (1994) 1319-1325; C.A., 121 (1994) 16636q.
- 502 Holstege, D.M., Scharberg, D.L., Tor, E.R., Hart, L.C. and Galey, F.D.: A rapid multiresidue screen for organophosphorus, organochlorine, and N-methyl carbamate insecticides in plant and animal tissues. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1263-1274.
- 503 Linkerhaegner, M. and Stan, H.J.: Screening analysis of pesticide residues in plant foodstuffs by capillary gas chromatography using the DFG multiresidue method S19. A comparison of customary detection by ECD/NPD with the novel atomic emission detector (AED). *Z. Lebensm.-Unters. Forsch.*, 198 (1994) 473-479; C.A., 121 (1994) 156040r.
- 504 Okamoto, K., Hirahara, Y., Narida, M., Miyada, M., Hasegawa, M., Koiguchi, S., Kamakura, K., Sotomi, Y. and Yamana, T.: (Studies on simultaneous determination of pyrethroid and organophosphorus pesticides and carbamate pesticides in agricultural products.) *Shokuhin Eisei Kenkyu*, 44, No. 6 (1994) 57-64; C.A., 121 (1994) 132512v.
- 505 Pico, Y., Louter, A.J.H., Vreuls, J.J. and Brinkman, U.A.T.: Online trace-level enrichment gas chromatography of triazine herbicides, organophosphorus pesticides, and organosulfur compounds from drinking and surface waters. *Analyst (Cambridge)*, 119 (1994) 2025-2031.
- 506 Schachterle, S., Brittain, R.D. and Mills, J.D.: Analysis of pesticide residues in food using gas chromatography-tandem mass spectrometry with a benchtop ion trap mass spectrometer. *J. Chromatogr. A*, 683 (1994) 185-193.

See also 171, 173.

- 29b. *Chlorinated insecticides*
- 507 Brodsky, E.S., Klyuev, N.A., Smirnova, O.B., Dovgilievitz, A.V. and Grandberg, I.I.: GC-MS analysis of photodegradation products of dichlophop-methyl. *Intern. J. Environ. Anal. Chem.*, 56 (1994) 11-21.
- 508 Driss, M.R., Zafzouf, M., Sabbah, S. and Bouguerra, M.L.: Simplified procedure for organochlorine pesticides residue analysis in honey. *Intern. J. Environ. Anal. Chem.*, 57 (1994) 63-71.
- 509 Lewis, R.G.: Determination of pesticides and polychlorinated biphenyls in indoor air by gas chromatography. *IARC Sci. Publ.*, 109 (1993) 353-376; C.A., 120 (1994) 329961b.
- 510 Luna, A., Molina, C., Barba, A., Garcia, S.N. and Camara, M.A.: (Organochlorinated insecticide residues in human fat. Comparison of analytical methods.) *Rev. Toxicol.*, 10 (1993) 129-132; C.A., 121 (1994) 51606b.
- 511 Mortimer, R.D., Black, D.B. and Dawson, B.A.: Pesticide residue analysis in foods by NMR. 3. Comparison of ^{19}F NMR and GC-ECD for analysing trifluralin residues in field-grown carrots. *J. Agric. Food Chem.*, 42 (1994) 1713-1716.
- 512 Mössner, S., Barudio, I., Spraker, T.S., Antonelis, G., Early, G., Geraci, J.R., Becker, P.R. and Ballschmiter, K.: Determination of HCHs, PCBs and DDTs in brain tissues of marine mammals of different age. *Fresenius J. Anal. Chem.*, 349 (1994) 708-716.
- 513 Nam, K.-S. and King, J.W.: Coupled SFE/SFC/GC for the trace analysis of pesticide residues in fatty food samples. *J. High Resolut. Chromatogr.*, 17 (1994) 577-582.
- 514 Oehme, M., Kallenborn, R., Wiberg, K. and Rappe, C.: Simultaneous enantioselective separation of chlordanes, a nonachlor compound, and o,p'-DDT in environmental samples using tandem capillary columns. *J. High Resolut. Chromatogr.*, 17 (1994) 583-588.
- 515 Picó, Y., Mañez, J. and Font, G.: Optimization of experimental conditions for the identification of pesticide mixtures on six GLC columns. *J. Chromatogr. Sci.*, 32 (1994) 386-392.
- 516 Shan, T.-H., Hopple, J.A. and Foster, G.D.: Alternative tissue analysis method developed for organochlorine contaminants in aquatic organisms. *Bull. Environ. Contam. Toxicol.*, 53 (1994) 382-389; C.A., 121 (1994) 75462c.
- 517 Sukul, P.: Extraction and clean up procedures for the analysis of permethrin, cypermethrin, deltamethrin and fenvalerate in crops by GLC-ECD. *Toxicol. Environ. Chem.*, 44 (1994) 217-223; C.A., 121 (1994) 156080d.
- 518 Van der Velde, E.G., Dietvorst, M., Swart, C.P., Ramlal, M.R. and Kootstra, P.R.: Optimization of supercritical fluid extraction of organochlorine pesticides from real soil samples. *J. Chromatogr. A*, 683 (1994) 167-174.
- 519 Viana, E., Moltó, J.C., Mañes, J. and Font, G.: Clean-up and confirmatory procedures for gas chromatographic analysis of pesticide residues. Part II. *J. Chromatogr. A*, 678 (1994) 109-117.
- 520 Vidal, L.H., Trevelin, W.R., Landgraf, M.D. and Rezende, M.O.O.: Determination of organochlorine pesticides dissolved in water: A comparison between solid phase and solvent extraction. *Intern. J. Environ. Anal. Chem.*, 56 (1994) 23-31.
- 521 Wenclawiak, B.W., Maio, G., v. Holst, C. and Darskus, R.: Solvent trapping of some chlorinated hydrocarbons after supercritical fluid extraction from soil. *Anal. Chem.*, 66 (1994) 3581-3586.
- 522 Wennrich, L., Efer, J., Mueller, S. and Engwald, W.: (Determination of trichlorfon in drinking water by solid-phase extraction and on-column capillary GC. Problems with real samples.) *Vom Wasser*, 82 (1994) 281-288; C.A., 121 (1994) 91119b.
- 523 Xu, Y., Zhang, Y., Oxynos, K., Schmitzer, J. and Kettrup, A.: Hexachlorocyclohexane (HCH) residues in Ya'er Lake area, China. *Intern. J. Environ. Anal. Chem.*, 57 (1994) 53-61.
- 524 Yarita, T., Nomura, A., Horimoto, Y. and Yamada, J.: Determination of chlorinated pesticides by packed column supercritical fluid chromatography/electron-capture detector. *Microchem. J.*, 49 (1994) 145-149; C.A., 120 (1994) 317694d.
- See also 231, 232, 241.
- 29c. *Phosphorus insecticides*
- 525 Barrio, C.S., Asensio J.S. and Bernal, J.G.: GC-NPD investigation of the recovery of organonitrogen and organophosphorus pesticides from apple samples: The effect of the extraction solvent. *Chromatographia*, 39 (1994) 320-324.
- 526 Drevenkár, V., Štengl, B. and Fröbe, Z.: Microanalysis of dialkyl-phosphorus metabolites of organophosphorus pesticides in human blood by capillary gas chromatography and by phosphorus-selective and ion trap detection. *Anal. Chim. Acta*, 290 (1994) 277-286.
- 527 Ferrario, J.B., DeLeon, I.R. and Peuler, E.A.: Bioaccumulation of chemical markers as a means for the field detection and verification of organophosphorus warfare agents. *Environ. Sci. Technol.*, 28 (1994) 1893-1897.
- 528 Hagmann, M. and Mohl, B.: (Determination of traces of nitrogen- and phosphorus pesticides.) *LaborPraxis*, 17, No. 5 (1993) 56-62; C.A., 121 (1994) 117097v.
- 529 Kadowaki, S. and Naitoh, H.: (Determination of ethylthiometon residues in environmental sample by gas chromatography/mass spectrometry.) *Kankyo Kagaku*, 3 (1993) 747-759; C.A., 121 (1994) 26013y.
- 530 Lentza-Rizos, C.: Monitoring pesticide residues in olive products: Organophosphorus insecticides in olives and oil. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1096-1100.
- 531 Li, H. and Wang, X.: Analysis of organophosphorus agrochemical residues in foods by capillary gas chromatography. *Zhonghua Yufang Yixue Zazhi*, 27 (1993) 356-359; C.A., 121 (1994) 33446v.
- 29d. *Carbamates*
- 532 Haddon, W.F., Mancini, M.L., McLaren, M., Effio, A., Harden, L.A., Degre, R.L. and Bradford, J.L.: Occurrence of ethyl carbamate (urethane) in U.S. and Canadian breads: measurements by gas chromatography-mass spectrometry. *Cereal Chem.*, 71 (1994) 207-215; C.A., 121 (1994) 7633j.
- 533 Kadenczki, L. and Szucs, E.: (Determination of dithio-carbamate residues by gas chromatography, using head space techniques.) *Novenyvedelem (Budapest)*, 30 (1994) 19-21; C.A., 121 (1994) 3131w.
- See also 466.

29e. *Herbicides*

- 534 Alcaraz, R., Caixach, J., Garcia-Raurich, J., Espadaler, I. and Rivera, J.: Comparison of extraction methods for phenoxyacid herbicides in water samples using gas chromatography coupled to mass spectrometry (HRGC/MS). *Quim. Anal. (Barcelona)*, 13, No. 2 (1994) 55-58; C.A., 121 (1994) 141095p.
- 535 Berdeaux, O., De Alencastro, L.F., Grandjean, D. and Tarradellas, J.: Supercritical fluid extraction of sulfonylurea herbicides in soil samples. *Intern. J. Environ. Anal. Chem.*, 56 (1994) 109-117.
- 536 Färber, H., Nick, K. and Schöler, H.F.: Determination of hydroxy-s-triazines in water using HPLC or GC-MS. *Fresenius J. Anal. Chem.*, 350 (1994) 145-149.
- 537 Hayakawa, S., Sarai, E. and Araki, K.: (Analysis of pesticides in sediment. Pretreatment method for sediment samples.) *Mienken Kankyo Kagaku Senta Kenkyu Hokoku*, 14 (1993) 49-53; C.A., 121 (1994) 52246w.
- 538 Lee, A.S., Hong, M.-K. and Smith, A.E.: Improved esterification of mecoprop for sensitive detection on capillary gas chromatography with mass selective and electron capture detection. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1077-1083.
- 539 Lee, X., Kumazawa, T., Sato, K. and Suzuki, O.: (Solid-phase extraction and capillary gas chromatography of diazine herbicides.) *Hochudoku*, 12 (1994) 118-119; C.A., 121 (1994) 101357u.
- 540 Tarasov, V.V. and Khalmatova, R.K.: (Gas chromatographic detection of reiser in environmental objects.) *Gig. Sanit.*, 8 (1993) 79-80; C.A., 120 (1994) 338050f.
- 541 Van der Velde, E.G., Ramlal, M.R., van Beuzekom, A.C. and Hoogerbrugge, R.: Effects of parameters on supercritical fluid extraction of triazines from soil by use of multiple linear regression. *J. Chromatogr. A*, 683 (1994) 125-139.

29f. *Fungicides*

- 542 Asilbekova, K.T. and Khasanova, V.M.: (Gas-chromatographic determination of triadimenol fungicide in environment and biological materials.) *Gig. Sanit.*, 2 (1993) 66-67; C.A., 120 (1994) 330000u.
- 543 Gan, J., Yates, S.R., Spencer, W.F. and Yates, M.V.: Automated headspace analysis of fumigants 1,3-dichloropropene and methyl isothiocyanate on charcoal sampling tubes. *J. Chromatogr. A*, 684 (1994) 121-131.
- 544 Gao, N., Sun, M. and Wang, Y.: (GC-MS separation and identification of Yekuling and its metabolites in rat liver perfusate.) *Zhongguo Huanjing Kexue*, 13 (1993) 127-131; C.A., 121 (1994) 2923u.
- 545 Oishi, M., Onishi, K., Kano, I., Nazakawa, H. and Tanabe, S.: Capillary gas chromatographic determination of thiabendazole in citrus and apple juices. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1293-1296.
- 546 Rietveld, R. and Quirijns, J.: On-line liquid chromatography-gas chromatography for determination of fenarimol in fruiting vegetables. *J. Chromatogr. A*, 683 (1994) 151-155.

- 547 Salau, J.S., Alonso, R., Batlló, G. and Barceló, D.: Application of solid-phase disk extraction followed by gas and liquid chromatography for the simultaneous determination of the fungicides: captan, captafol, carbendazim cholorothalonil, ethirimol, folpet, metalaxyl and vinclozolin in environmental waters. *Anal. Chim. Acta*, 293 (1994) 109-117.
- 548 Sato, K.: (Simultaneous determination of imazalil and thiabendazole by gas chromatography.) *Nippon Juishikai Zasshi*, 47 (1994) 213-216; C.A., 121 (1994) 56068n.

29g. *Other types of pesticides and various agrochemicals*

- 549 Nowacka-Krukowska, H., Czajka, M. and Sledzinski, B.: (Determination of flualinate residues in honey and wax after using of some mite infestation control products.) *Pestycydy (Warsaw)*, 1 (1994) 31-37; C.A., 121 (1994) 106795v.
- 550 Shosunova, A.F., Sanyagina, N.A. and Makin, G.I.: (Use of gas-liquid chromatography for determination of organotin pesticides in plants and in soil.) *Zh. Org. Khim.*, 4 (1993) 698-702; C.A., 121 (1994) 29112r.
- 551 Xiang, W. and Su, S.: (Gas chromatographic method for the determination of chlorosulfuron residues in soil.) *Fenxi Huaxue*, 22, No. 6 (1994) 605-608; C.A., 121 (1994) 127699g.

31. PLASTICS AND THEIR INTERMEDIATES

- 552 Buzanowski, W.C., Cutié, S.S., Howel, R., Papenfuss, R. and Smith, C.G.: Determination of sodium polyacrylate by pyrolysis-gas chromatography. *J. Chromatogr. A*, 677 (1994) 355-364.
- 553 Ding, M., Xu, Z., Zhang, J. and Meng, H.: (Pyrolysis gas chromatographic study on reaction process of PMR-type polyimide precursors.) *Yingyong Huaxue*, 11 (1994) 107-111; C.A., 121 (1994) 135350b.
- 554 Etxeberria, A., Uriarte, C., Fernandez-Berridi, M.J. and Iruin, J.J.: Estimation of interaction parameters of a poly(hydroxy ether of bisphenol A)/poly(vinyl methyl ether) blend by inverse gas chromatography. *Polymer*, 35, No. 10 (1994) 2128-2132; C.A., 121 (1994) 10570s.
- 555 Gronova, G.L., Shukurina, K.N., Korolev, A.A., Kabarova, E.Y., Martynenko, A.T., Sycheva, T.I., Mikaya, A.I., Topchiev, D.A. and Berezkin, V.G.: (Evaluation of the purity of some water-soluble monomers by gas-liquid chromatography and chromatography-mass spectrometry.) *Zavod. Lab.*, 59, No. 12 (1993) 13-16.
- 556 Holzbauer, H.R. and Just, U.: Adducts by supercritical fluid chromatography. *Tenside, Surfactants, Deterg.*, 31 (1994) 79-82; C.A., 121 (1994) 10437d.
- 557 Jackson, P.L. and Huglin, M.B.: Use of inverse gas chromatography to assess the compatibility of polyurethane foam with liquids at different temperatures. *Polym. Int.*, 33, No. 4 (1994) 409-411; C.A., 120 (1994) 324807w.
- 558 Kaya, I. and Ceylan, K.: Estimation of glass transition temperature and heat of adsorption of polyvinyl chloride by inverse phase gas chromatography. *Turk. J. Chem.*, 17 (1993) 1-6; C.A., 121 (1994) 84450z.
- 559 Kinugasa, S., Ida, S. and Takeuchi, M.: (Separation of poly(ethyleneglycol)s by supercritical fluid chromatography.) *Busshtsu Kogaku Kogyo Gijutsu Kenkyusho Hokoku*, 2 (1994) 219-222; C.A., 120 (1994) 324596b.

- 560 MacKay, G.A. and Smith, R.M.: Supercritical fluid extraction-supercritical fluid chromatography/mass spectrometry for the analysis of additives in polyurethanes. *J. Chromatogr. Sci.*, 32 (1994) 455-460.
- 561 Montaudo, G., Puglisi, C., Blazo, M., Kishore, K. and Ganesh, K.: Thermal degradation products of poly(styrenesulfides) investigated by direct pyrolysis-mass spectrometry and flash pyrolysis-gas chromatography/mass spectrometry. *J. Anal. Appl. Pyrolysis*, 29 (1994) 207-222; C.A., 121 (1994) 158334p.
- 562 Mukhopadhyay, P. and Schreiber, H.P.: Aspects of polymer surface characterization by inverse gas chromatography. *J. Polym. Sci., Part B: Polym. Phys.*, 32, No. 9 (1994) 1653-1656; C.A., 121 (1994) 58441c.
- 563 Nishe, M. and Okai, F.: (Analysis of polyester components by pyrolytic gas chromatography) *Jpn. Kokai Tokkyo Koho* JP 05,322,865 [93,322,865] (Cl.G01N30/06), 07 Dec. 1993, Appl. 91/142,513, 17 May 1991; 3 pp; C.A., 120 (1994) 324694g.
- 564 O'Connor, M.J., Bigger, S.W., Scheirs, J., Janssens, J.L.G.M. and Linssen, J.P.H.: Some aspects of odor characterization in polyethylene resins. *Polym. Prepr.*, 34 (1993) 247-248; C.A., 121 (1994) 10840e.
- 565 Petri, H-M. and Wolf, B.A.: Concentration-dependent thermodynamic interaction parameters for polymer solutions: Quick and reliable determination via normal gas chromatography. *Macromolecules*, 27 (1994) 2714-2718; C.A., 120 (1994) 324674a.
- 566 Tan, Z., Jaeger, R. and Vancso, G.J.: Crosslinking studies of poly(dimethylsiloxane) networks: a comparison of inverse gas chromatography, swelling experiments and mechanical analysis. *Polymer*, 35 (1994) 3230-3236; C.A., 121 (1994) 134963s.
- 567 Watanabe, C.: Characterization of polymers. Development of analytical Py-GC system of polymeric materials. *Kobunshi*, 43 (1994) 110-111; C.A., 121 (1994) 110025m.
- 568 Yamada, T., Okumodo, T., Ohtani, H. and Tsuge, S.: (Characterization of polymers by pyrolysis gas chromatography. Application to EPDM rubbers.) *Nippon Gomu Kyokaishi*, 66 (1993) 530-540; C.A., 121 (1994) 11444r.
- See also 22, 37, 42, 45, 249, 293, 488, 679.
- ### 32. DRUG ANALYSIS
- 32a. Drug analysis, general techniques
- 569 Chen, X.H., Franke, J.P., Wijsbeek, J. and de Zeeuw, R.A.: Determination of basic drugs extracted from biological matrixes by means of solid-phase extraction and wide-bore capillary gas chromatography with nitrogen-phosphorus detection. *J. Anal. Toxicol.*, 18 (1994) 150-153; C.A., 121 (1994) 26135q.
- 570 Hara, K., Kageura, M., Kashimura, S., Hieda, Y. and Tanaka, K.: (Screening of drugs and poisons by REMEDI and GC/MS) *Hochudoku*, 12 (1994) 154-155; C.A., 121 (1994) 127225z.
- 571 Kot, A., Sandra, P. and Venema, A.: Sub- and supercritical fluid chromatography on packed columns: A versatile tool for the enantioselective separation of basic and acidic drugs. *J. Chromatogr. Sci.*, 32 (1994) 439-448.
- 572 Wynia, G., Post, P., Broersen, J. and Maris, F.A.: Ruggedness testing of gas chromatographic method for residual solvents in pharmaceutical substances. *Chromatographia*, 39 (1994) 355-362.
- 573 Zygmunt, B. and Wardencki, W.: Some aspects of (GC-MS) application in environmental organic analysis. *Pol. J. Chem.*, 67 (1993) 369-378; C.A., 121 (1994) 90259k.
- See also 314, 448, 478.
- 32b. Antirheumatics and antiinflammatory drugs
- 574 Avadhanulu, A.B., Pantulu, A.R.R. and Anjaneyulu, Y.: Gas liquid chromatographic estimation of (1) chlorzoxazone and paracetamol (2) chlormezanone and paracetamol in single and combined dosage forms. *Indian Drugs*, 31 (1994) 201-204; C.A., 121 (1994) 141884v.
- 575 Giachetti, C., Assandri, A., Zanolo, G. and Tenconi, A.: MSD, ECD and NPD performances compared in the assay of six non steroidial anti-inflammatory drugs in plasma samples. *Chromatographia*, 39 (1994) 162-169.
- 576 Giachetti, C., Assandri, A., Zanolo, G. and Bremilla, E.: Gas chromatography-mass spectrometry determination of etodolac in human plasma following single epicutaneous administration. *Biomed. Chromatogr.*, 8 (1994) 180-183.
- 577 Myung, S.-W., Kim, M.-S., Yoon, C.-N., Park, J.-S. and Ahn, W.-S.: Gas chromatographic-electron-impact chemical ionization mass spectrometric identification of cinmetacin and its metabolites in human urine. *J. Chromatogr. B*, 660 (1994) 75-84.
- 578 Wang, H., Deng, Z., Jiang, W. and Song, L.: (Analysis of volatile organic pollutants with Curie point desorption gas chromatographic method. 3. Quantitative analysis.) *Huanjing Wuran Yu Fangzhi*, 15, No. 4 (1993) 34-36; C.A., 121 (1994) 140383u.
- 579 Wilson, W.H.: Direct enantiomeric resolution of ibuprofen and flurbiprofen by packed column SFC. *Chirality*, 6 (1994) 216-219; C.A., 121 (1994) 92004x.
- 580 Wu Lanjun, Li Zhi, Hu Wenhao and Jiang Yaohong: (Study on synthesis reaction of 6-methoxy-2-acetonaphthalene - A key intermediate of Naproxen by gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS)) *Chin. J. Chromatogr.*, 12 (1994) 361-363.
- 32c. Autonomic and cardiovascular drugs
- 581 Bailey, C.J., Ruane, R.J. and Wilson, I.D.: Packed-column supercritical fluid chromatography of β -blockers. *J. Chromatogr. Sci.*, 32 (1994) 426-429.
- 582 Bargmann-Leyder, N., Siret, L., Tambute, A. and Caude, M.: (Direct and rapid enantiomeric separation of β -blockers by supercritical carbon dioxide chromatography coupled with ChiroSine-A.) *Spectra Anal.*, 22, No. 171 (1993) 27-30; C.A., 121 (1994) 164097e.
- 583 Carreras, D., Imaz, C., Navajas, R., Garcia, M.A., Rodriguez, C., Rodriguez, A.F. and Cortes, R.: Comparison of derivatization procedures for the determination of diuretics in urine by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 683 (1994) 195-202.

- 584 Deutsch, J., Hegedus, L., Greig, N.H., Rapoport, S.I. and Soncrant, T.T.: Evidence of transacylation of scopolamine in the gas-chromatograph inlet. *Anal. Lett.*, 27 (1994) 671-679.
- 585 Hooijerink, H., Schilt, R., van Bennekom, E.O. and Huf, F.A.: Determination of beta-sympathomimetics in liver and urine by immunoaffinity chromatography and gas chromatography-mass-selective detection. *J. Chromatogr. B*, 660 (1994) 303-313.
- 586 Li, F., Cooper, S.F., Côté, M. and Ayotte, C.: Determination of the enantiomers of bunolol in human urine by high-performance liquid chromatography on a chiral AGP stationary phase and identification of their metabolites by gas chromatography-mass spectrometry. *J. Chromatogr. B*, 660 (1994) 327-339.
- 587 Martens, J., Banditt, P. and Meyer, F.P.: Determination of nifedipine in human serum by gas chromatography-mass spectrometry: validation of the method and its use in bioavailability studies. *J. Chromatogr. B*, 660 (1994) 297-302.
- 588 Oertel, R., Richter, K., Trausch, B., Berndt, A., Gramatté, T. and Kirch, W.: Elucidation of the structure of talinolol metabolites in man. Determination of talinolol and hydroxylated talinolol metabolites in urine and analysis of talinolol in serum. *J. Chromatogr. B*, 660 (1994) 353-363.
- 589 Tenczer, J., Lappenberg-Pelzer, M., Schneider, V., Demme, U. and Köppel, C.: Fatal poisoning with detajmium: identification of detajmium and its metabolites and artifacts by gas chromatography-mass spectrometry and quantification by high-performance liquid chromatography. *J. Chromatogr. B*, 660 (1994) 47-55.
- 590 Toba, F., Ando, M., Hamada, T., Awata, N., Tuda, T. and Kinoshita, K.: A sensitive determination of eperisone in plasma by GC/MS. *J. Mass Spectrom. Soc. Jpn.*, 41 (1993) 235-243; *C.A.*, 121 (1994) 26133n.
- 591 Yang, X. and Chen, X.: (Determination of clonidine in plasma by gas chromatography.) *Yaowu Fenxi Zazhi*, 14, No. 2 (1994) 24-26; *C.A.*, 121 (1994) 148204g.
- 32d. Central nervous system drugs
- 592 Almquist, S.R., Petersson, P., Walther, W. and Markides, K.E.: Direct and indirect approaches to enantiomeric separation of benzodiazepines using micro column techniques. *J. Chromatogr. A*, 679 (1994) 139-146.
- 593 Black, D.A., Clark, G.D., Haver, V.M., Garbin, J.A. and Saxon, A.J.: Analysis of urinary benzodiazepines using solid-phase extraction and gas chromatography-mass spectrometry. *J. Anal. Toxicol.*, 18 (1994) 185-188; *C.A.*, 121 (1994) 101389f.
- 594 Feng, L., Xuying, H. and Yi, L.: Investigation of meperidine and its metabolites in urine of an addict by gas chromatography-flame ionization detection and gas chromatography-mass spectrometry. *J. Chromatogr. B*, 658 (1994) 375-379.
- 595 Fenton, J., Mumford, J. and Childers, M.: Hydromorphone and hydrocodone interference in GC/MS assays for morphine and codeine. *J. Anal. Toxicol.*, 18 (1994) 159-164; *C.A.*, 121 (1994) 2744m.
- 596 Hu, X.Y., Liu, F. and Luo, Y.: (Analysis of meperidine and its metabolites in urine of an addict GC/FID and GC/MS.) *Yaoxue Xuebao*, 29 (1994) 116-121; *C.A.*, 121 (1994) 124458s.
- 597 Huo, J.-Z., van Boekelaer, J., Lambert, W.E. and de Leenheer, A.P.: Determination of embutramine in biological matrices by gas chromatography with nitrogen-phosphorus detection. *J. Chromatogr. B*, 661 (1994) 69-74.
- 598 Ishii, A., Hattori, H., Seno, H., Kumazawa, T. and Suzuki, O.: Determination of aminopyrine in body fluids by gas chromatography with surface ionization detection. *Hochudoku*, 11 (1993) 182-186; *C.A.*, 121 (1994) 2698z.
- 599 Koga, S., Hayama, Y. and Kouta, M.: (Application of gas chromatography-mass spectrometry for qualitative analysis of methamphetamine and its raw materials, etc. by chemical ionization method.) *Kanzei Chuo Bunsekishoho*, 33 (1994) 55-63; *C.A.*, 121 (1994) 75481h.
- 600 Kurazono, K., Matuzaki, R., Nagai, M., Inde, S. and Yagasaki, K.: (Analysis of psychotropic drugs by gas chromatography.) *Kanzei Chuo Bunsekishoho*, 33 (1994) 49-53; *C.A.*, 121 (1994) 141857p.
- 601 Labroo, R. and Kharasch, E.D.: Gas chromatographic-mass spectrometric analysis of alfentanil metabolites. Application to human liver microsomal alfentanil biotransformation. *J. Chromatogr. B*, 660 (1994) 85-94.
- 602 Lawrence, J.K., Larsen, A.K., Jr. and Tebbett, I.R.: Supercritical fluid extraction of benzodiazepines in solid dosage forms. *Anal. Chim. Acta*, 288 (1994) 123-130.
- 603 Lin, Z., Lafolie, P. and Beck, O.: Evaluation of analytical procedures for urinary codeine and morphine measurements. *J. Anal. Toxicol.*, 18 (1994) 129-133; *C.A.*, 121 (1994) 2742j.
- 604 Liu, F., Hu, X. and Li, Q.: (Quantitative analysis of ketamine and xylazine in plasma and brain homogenates of rats by GC-MS.) *Fenxi Ceshi Xuebao*, 12 (1993) 26-30; *C.A.*, 120 (1994) 315063y.
- 605 Moeller, M.R., Fey, P. and Wennig, R.: Simultaneous determination of drugs of abuse (opiates, cocaine and amphetamine) in human hair by GC/MS and its application to a methadone treatment program. *Forensic Sci. Int.*, 63 (1993) 185-206; *C.A.*, 120 (1994) 317421n.
- 606 Nihira, M., Hayashida, M., Hirakawa, K., Uekusa, K., Ohno, Y. and Nakahara, Y.: (Morphine on the urine after ingestion of poppy seed food.) *Hochudoku*, 12 (1994) 140-141; *C.A.*, 121 (1994) 127222w.
- 607 Poletti, A., Groppi, A. and Montagna, M.: Rapid and highly selective GC/MS/MS detection of heroin and its metabolites in hair. *Forensic Sci. Int.*, 63 (1993) 217-225; *C.A.*, 120 (1994) 317423q.
- 608 Rao, M.L., Staberock, U., Baumann, P., Hiemke, C., Deister, A., Cuendet, C., Amey, M., Haertter, S. and Kraemer, M.: Monitoring tricyclic antidepressant concentrations in serum by fluorescence polarization immunoassay compared with gas chromatography and HPLC. *Clin. Chem. (Washington)*, 40 (1994) 929-933.
- 609 Riggs, K.W., Szeitz, A., Rurak, D.W., Mutlib, A.E., Abbott, F.S. and Axelson, J.E.: Determination of metoclopramide and two of its metabolites using a sensitive and selective gas chromatographic-mass spectrometric assay. *J. Chromatogr. B*, 660 (1994) 315-325.
- 610 Romanishyn, L.A., Wagner, M.C., Wichmann, J.K., Kucharczyk, N. and Sofia, R.D.: Determination of valproate of felbamate in human plasma by narrow bore capillary gas chromatography. *Epilepsia (N.Y.)*, 35, No. 2 (1994) 406-410; *C.A.*, 121 (1994) 148206j.

- 611 Sachs, H. and Raff, I.: Comparison of quantitative results of drugs in human hair by GC/MS. *Forensic Sci. Int.*, 63 (1993) 207-216; C.A., 120 (1994) 317422p.
- 612 Sieveret, H.J.P.: Determination of amphetamine and methamphetamine enantiomers by chiral derivatization and gas chromatography-mass spectrometry as a test case for an automated sample preparation system. *Chirality*, 6 (1994) 295-301; C.A., 121 (1994) 141862m.
- 613 Song, D., Zhang, S. and Kohlhof, K.: Determination of chlor diazepoxide in mouse plasma by gas chromatography-negative-ion chemical ionization mass spectrometry. *J. Chromatogr. B*, 660 (1994) 95-101.
- 614 Terada, M. and Wagasugi, C.: (Simultaneous determination of oxazolobenzodiazepine drugs by wide bore column gas chromatography with nitrogen-phosphorus detection.) *Hochudoku*, 12 (1994) 116-117; C.A., 121 (1994) 141878w.
- 615 Tsuchihashi, H., Nishikawa, M., Katagi, M. and Tatsuno, M.: (Determination of triazolam and its metabolites in human urine by EMIT, gas chromatography-mass spectrometry and liquid chromatography-mass spectrometry.) *Hochudoku*, 12 (1994) 134-135; C.A., 121 (1994) 127220u.
- 616 Uges de Medewerkers, D.R.A.: (Determination of some xenobiotics in body fluids. XXVII Amphetamine.) *Ziekenhuisfarmacie*, 10 (1994) 31-35; C.A., 121 (1994) 101365v.
- 617 Wang, W.-L., Darwin, W.D. and Cone, E.J.: Simultaneous assay of cocaine, heroin and metabolites in hair, plasma, saliva and urine by gas chromatography-mass spectrometry. *J. Chromatogr. B*, 660 (1994) 279-290.
- 618 Woestenborghs, R.J.H., Timmerman, P.M.M.B.L., Cornelissen, M.-L. J.E., Van Rompaey, F.A.M.B.S., Gepts, E., Camu, F., Heykants, J.J.P. and Stanski, D.R.: Assay methods for sufentanil in plasma: Radioimmunoassay versus gas chromatography-mass spectrometry. *Anesthesiology*, 80 (1994) 666-670; C.A., 121 (1994) 132m.
- 619 Yuan, C. and Zhu, J.: (Identification of fifteen hypnotic sedative drugs by UV and GC.) *Zhongguo Yiyao Gongye Zaishi*, 25 (1994) 18-20; C.A., 121 (1994) 117891z.

See also 156, 158, 580, 635.

32e. Chemotherapeutics (exc. cytostatics and antibiotics)

- 620 Blanchflower, W.J., Hughes, P.J., Cannavan, A. and Kennedy, G.: Determination of diclazuril in avian feed and premixes with gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.*, 77 (1994) 1061-1065.
- 621 Utsui, Y.: (Bacterial action of beta-lactam microbial drugs and gas chromatographical identification of anaerobic bacteria.) *Bunseki*, 10 (1993) 791-795; C.A., 121 (1994) 53732p.

See also 294.

32f. Cytostatics

- 622 Momeryc, G., van Cauwenbergh, K., de Brujin, E.A., van Oosterom, A.T., Highley, M.S. and Harper, P.G.: Determination of iphosphamide and seven metabolites in blood plasma, as stable trifluoracetyl derivate, by electron capture chemical ionization GC-MS. *J. High Resolut. Chromatogr.*, 17 (1994) 655-661.

See also 357, 607, 611.

32g. Other drug categories

- 623 Ishii, A., Seno, H., Kumazawa, T. and Suzuki, O.: Determination of tertiary amino antitussives in body fluids by gas chromatography with surface ionization detection. *Hochudoku*, 11 (1993) 176-181; C.A., 121 (1994) 133n.
- 624 Lessard, D., Comeau, B., Charlebois, A., Letarte, L. and Davis, I.M.: Quantification of GR90291 in human blood by high resolution gas chromatography-mass selective detection (HRGC-MSD). *J. Pharm. Biomed. Anal.*, 12 (1994) 659-665; C.A., 121 (1994) 98948e.
- 625 Smith, M.S., Oxford, J. and Evans, M.B.: Improved method for the separation of raniditine and its metabolites based on supercritical fluid chromatography. *J. Chromatogr. A*, 683 (1994) 402-406.
- 626 Wong, S.H.Y., Ghodgaonkar, B., Fong, P., Campbell, B., Burdick, J.F. and Boctor, F.: Supercritical fluid chromatography for therapeutic drug monitoring of immunosuppressants: selectivity for cyclosporine A, FK 506 (tacrolimus), and rapamycin. *J. Liq. Chromatogr.*, 17 (1994) 2093-2109.

See also 348, 371.

32h. Toxicological and forensic applications

- 627 Clark, C.R., DeRuiter, J., Andurkar, S. and Noggle, F.T.: Analysis of 3,4-methylenedioxymethyl-2-propanone and 3,4-methylenedioxymphetamine prepared from isosafrole. *J. Chromatogr. Sci.*, 32 (1994) 393-402.
- 628 DiGregorio, G.J., Ferko, A.P., Barbieri, E.J., Ruch, E.K., Chawla, H., Koehane, D., Rosenstock, R. and Aldano, A.: Determination of cocaine usage in pregnant women by a urinary EMIT drug screen and GC-MS analyses. *J. Anal. Toxicol.*, 18 (1994) 247-250; C.A., 121 (1994) 150677g.
- 629 Drummer, O.H., Horomidis, S., Kourtis, S., Syrjanen, M. and Tippett, P.: Capillary gas chromatographic drug screen for use in forensic toxicology. *J. Anal. Toxicol.*, 18 (1994) 134-138; C.A., 121 (1994) 28720a.
- 630 Hernandez, A., Andollo, W. and Hearn, W.L.: Analysis of cocaine and metabolites in brain using solid phase extraction and full-scanning gas chromatography/ion trap mass spectrometry. *Forensic Sci. Int.*, 65 (1994) 149-156; C.A., 121 (1994) 150667d.
- 631 Kudo, K., Nagata, T., Imamura, T., Jitsufuchi, N. and Kimura K.: (Quantitative analysis of Δ^9 -tetrahydrocannabinol (THC) in human solid tissues by GC/MS.) *Hochudoku*, 12 (1994) 136-137; C.A., 121 (1994) 127221v.
- 632 Logan, B.K., Friel, P.N. and Case, G.A.: Analysis of sertraline (Zoloft) and its major metabolite in postmortem specimens by gas and liquid chromatography. *J. Anal. Toxicol.*, 18 (1994) 139-142; C.A., 121 (1994) 26134p.

See also 84, 217, 278, 617.

32*i.* Plant extracts

- 633 Feng, L., Liu, Q. and Sun, X.: (Quantitative determination of paeonol in Nujinwan by gas chromatograph.) *Zhongguo Zhongyao Zazhi*, 19, No. 2 (1994) 92-93; C.A., 121 (1994) 331244p.
- 634 Feng, Y., Huang, C. and Ye, C.: (Determination of paeonol in guizhi-fuling capsule by GC.) *Zhongguo Yaoke Daxue Xuebao*, 25, No. 1 (1994) 15-17; C.A., 121 (1994) 91974b.
- 635 Gasparri de Vasquez, A., Najera, M., Sala, G., Baldini, O., Mandrile, E. and Cafferata, L.F.R.: (Gas-chromatographic analysis and pharmacodynamic action of the volatile compounds of "mataojo" (*Pouteria salicifolia* (Spreng.) Radlk.) *Acta Farm. Bonaerense*, 12 (1993) 5-14; C.A., 12 (1994) 91975c.
- 636 Vilegas, J.H.Y., Lancas, F.M. and Cervi, A.C.: High resolution gas chromatography analysis of "espinheira santa" (*Maytenus ilicifolia* and *M. aquifolium*): Analysis of crude drug adulterations. *Phytoter. Res.*, 8 (1994) 241-244; C.A., 121 (1994) 141843f.

See also 416, 417.

33. CLINICO-CHEMICAL APPLICATIONS

- 33b. Complex mixtures and profiling (single compounds by cross-reference only)

See 198, 336, 380, 445, 446.

34. FOOD ANALYSIS

- 34b. Complex mixtures (single compounds by cross-reference only)

- 637 Calapaj, R., Chircosta, S., Saija, G. and Bivona, V.: (Comparison of gas chromatographic and spectrophotometric data for the detection of seed oils an olive oil samples.) *Riv. Ital. Sostanze Grasse*, 70 (1993) 585-594; C.A., 121 (1994) 81206p.
- 638 Galletti, G.C., Mincione, B., Mellon, F.A. and Waldron, K.W.: Application of pyrolysis/gas chromatography/mass spectrometry to the analysis of kiwi mucilage. *Ital J. Food Sci.*, 5 (1993) 379-386; C.A., 121 (1994) 81194h.
- 639 Lagoudaki, M. and Demertzis, P.G.: Equilibrium moisture characteristics of dehydrated food constituents as studied by a modified inverse gas chromatographic method. *J. Sci. Food Agric.*, 65 (1994) 101-109; C.A., 121 (1994) 7623f.

See also 203, 210, 220, 241, 295, 302, 315, 333, 337, 340, 344, 353, 355, 365, 368, 374, 378, 379, 384, 388, 401, 402, 403, 435, 468, 470, 483, 487, 499, 503, 506, 508, 513, 517, 525, 530, 531, 532, 545, 546, 549, 606, 696.

- 34c. Organoleptically important compounds (flavors, odors, volatiles)

- 640 Casabianca, H. and Graff, J.B.: Enantiomeric and isotopic analysis of flavour compounds of some raspberry cultivars. *J. Chromatogr. A*, 684 (1994) 360-365.

- 641 Coleman, W.M.III., White, J.L. and Perfetti, T.A.: A hyphenated GC-based quantitative analysis of volatile materials from natural products. *J. Chromatogr. Sci.*, 32 (1994) 323-327.
- 642 Da Silva, M.A.A.P., Elder, V., Lederer, C.L., Lundahl, D.S. and McDaniel, M.R.: Flavor properties and stability of a corn-based snack: relating sensory, gas chromatography, and mass spectrometry data. *Dev. Food Sci.*, 33 (1993) 707-738; C.A., 121 (1994) 81433k.
- 643 De Maria, C.A.B., Trugo, L.C., Moreira, R.F.A. and Werneck, C.C.: Composition of green coffee fractions and their contribution to the volatile profile formed during roasting. *Food Chem.*, 50, No. 2 (1994) 141-145; C.A., 121 (1994) 7601x.
- 644 Herraiz, T. and Ough, C.S.: Separation and characterization of 1,2,3,4-tetrahydro- β -carboline-3-carboxylic acids by HPLC and GC-MS. Identification in wine samples. *Am. J. Enol. Vitic.*, 45 (1994) 92-101; C.A., 121 (1994) 81198n.
- 645 Jirovetz, L., Buchbauer, G. and Nikiforov, A.: (Applications of gas chromatography-FTIR-mass spectrometry in analysis of natural products.) *GIT Fachz. Lab.*, 38 (1994) 449-450; C.A., 121 (1994) 72707a - a review with 10 refs.
- 646 Karwowska, K. and Wilczynska, G.: (Interactions between plant aroma extracts and soybean protein during three basic thermal treatments. II. Gas chromatographic studies of the interactions between extracts of natural spices and soybean protein.) *Pr. Inst. Lab. Badaw. Przem. Spozyw.*, 48 (1993) 69-90; C.A., 121 (1994) 56172s.
- 647 Michel, G., Tsaconas, C., Guyot, J.-L. and Prost, M.: Analytical methodology in expert evaluation. Abnormal taste problems in wines. *Ann. Falsif. Expert. Chim. Toxicol.*, 86 (1993) 337-356; C.A., 121 (1994) 7518a - a review with 11 refs.
- 648 Moshonas, M.G. and Shaw, P.E.: Quantitative determination of 46 volatile constituents in fresh, unpasteurized orange juices using dynamic headspace gas chromatography. *J. Agric. Food Chem.*, 42 (1994) 1525-1528.
- 649 Raghavan, S.K., Connell, D.R. and Khayat, A.: Canola oil flavor quality evaluation by dynamic headspace gas chromatography. *ACS Symp. Ser.*, 558 (1994) 292-300; C.A., 121 (1994) 132620d.
- 650 Raghavan, S.K., Connell, D.R. and Khayat, A.: Capillary gas chromatography procedure for determining olive oil flavor. *ACS Symp. Ser.*, 558 (1994) 315-324; C.A., 121 (1994) 132622f.
- 651 Salinas, M.R., Alonso, G.L. and Esteban-Infantes, F.J.: Adsorption-thermal desorption gas chromatography applied to the determination of wine aromas. *J. Agric. Food Chem.*, 42 (1994) 1328-1331.
- 652 Xiong, Y., Zhang, Y. and Li, X.: (Rapid headspace gas chromatographic determination of ester aroma of Shanxi old vinegar.) *Shipin Yu Fajiao Gongye*, 6 (1993) 45-48; C.A., 121 (1994) 56069p.
- 653 Zhou Yu, Wei Hong, Wu Tiansong and Lin Yaping: (Analysis of aroma components of oolong tea "TIKUANYIN" by gas chromatography/mass spectrometry (GC/MS).) *Chin. J. Chromatogr.*, 12 (1994) 355-357.

See also 334, 459.

35. ENVIRONMENTAL ANALYSIS

35a. General papers and reviews

- 654 Abeel, S.M., Vickers, A.K. and Decker, D.: Trends in purge and trap. *J. Chromatogr. Sci.*, 32 (1994) 328-338.
- 655 Alcock, R.E., Halsall, C.J., Harris, C.A., Johnston, A.E., Lead, W.A., Sanders, G. and Jones, K.C.: Contamination of environmental samples prepared for PCB analysis. *Environ. Sci. Technol.*, 28 (1994) 1838-1842.
- 656 Hennion, M.-C., Pichon, V. and Barceló: Surface water analysis (trace-organic contaminants) and EC regulations. *TrAC*, 13 (1994) 361-372.
- 657 Voice, T.C. and Kolb, B.: Comparison of European and American techniques for the analysis of volatile organic compounds in environmental matrices. *J. Chromatogr. Sci.*, 32 (1994) 306-311.

See also 17, 51, 303.

35b. Air pollution (complex mixtures; single compounds by cross-reference only)

- 658 Gehrig, R., Herzog, A. and Hofer, P.: (Volatile organic compounds (VOC) in air. Measurement and data interpretation.) *Chimia*, 48 (1994) 182-186; *C.A.*, 121 (1994) 116347q.
- 659 Hildemann, L.M., Mazurek, M.A., Cass, G.R. and Simoneit, B.R.T.: Seasonal trends in Los Angeles ambient organic aerosol observed by high-resolution gas chromatography. *Aerosol Sci. Technol.*, 20 (1994) 303-317; *C.A.*, 121 (1994) 64348u.
- 660 Leichnitz, K.: Determination of organic solvent vapors in indoor air using charcoal adsorption and gas chromatography. *IARC Sci. Publ.*, 109 (1993) 211-220; *C.A.*, 121 (1994) 41558y.
- 661 Pavlov, V.N., Nikolaeva, T.D., Nazarov, A.G. and Troitskaya, O.E.: (Determination of micro-impurities of organic substances and their physical properties.) *Gig. Sanit.*, 9 (1993) 69-70; *C.A.*, 120 (1994) 338096a.
- 662 Pellizzari, E.D., Sheldon, L., Keever, J., Whitaker, D. and Wallace, L.: Determination of airborne organic compounds using Tenax GC and gas chromatography-mass spectrometry. *IARC Sci. Publ.*, 109 (1993) 196-210; *C.A.*, 121 (1994) 41557x.
- 663 Pozhidaev, V.M., Pozhidaeva, K.A. and Orlova, L.A.: (Gas-chromatographic determination of methyl chlorocarbonate in ambient air.) *Gig. Sanit.*, 6 (1993) 69-70; *C.A.*, 120 (1994) 329941v.
- 664 Smith, D.F., Kleindienst, T.E., Hudgens, E.E. and Bufalini, J.J.: Measurement of organic atmospheric transformation products by gas chromatography. *Intern. Environ. Anal. Chem.*, 54 (1994) 265-281.

See also 53, 208, 213, 215, 221, 228, 239, 242, 245, 246, 256, 260, 288, 298, 311, 316, 352, 354, 408, 430, 432, 433, 439, 457, 463, 501, 509, 677, 713.

35c. Water pollution (complex mixtures; single compounds by cross-reference only)

- 665 De Voogt, P.: Chromatographic clean-up methods for the determination of persistent organic compounds in aqueous environmental samples. *TrAC*, 13 (1994) 389-397.

- 666 Gawłowski, J., Gierczak, T. and Niedzielski, J.: Identification of volatile organics in Warsaw tap water. *Chem. Anal. (Warsaw)*, 39 (1994) 423-430.
- 667 Hu, X., Guo, H. and Cao, J.: (Identification of chemical warfare agents and their hydrolysis products in water.) *Junshi Yixue Kexueyuan Yuankan*, 18 (1994) 28-29; *C.A.*, 121 (1994) 2696x.
- 668 Klemp, M., Peters, A. and Sacks, R.: High-speed GC analysis of VOCs: Sample collection and inlet systems. *Environ. Sci. Technol.*, 28 (1994) 369-377.
- 669 Reemtsma, T. and Jekel, M.: Improving GC-MS screening analysis by functional-group-related silica gel fractionation of industrial wastewater extracts. *J. High Resolut. Chromatogr.*, 17 (1994) 589-592.
- 670 Schlegelmilch, F.: Purge and Trap-Apparatur. Online-Anreicherung von Schadstoffen aus Wasser. *LaborPraxis*, 18, No. 4 (1994) 18-24.
- 671 Young, M.S. and Uden, P.C.: Byproducts of the aqueous chlorination of purines and pyrimidines. *Environ. Sci. Technol.*, 28 (1994) 1755-1758.

See also 66, 163, 164, 212, 215, 216, 231, 232, 233, 235, 248, 250, 253, 283, 289, 290, 292, 297, 300, 319, 364, 435, 465, 496, 497, 498, 505, 520, 522, 523, 528, 534, 547, 676, 697.

35d. Soil pollution (complex mixtures; single compounds by cross-reference only)

- 672 Kimbrough, D.E., Chin, R. and Wakakuwa, J.: Wide-spread and systematic errors in the analysis of soils for polychlorinated biphenyls. Part 3. Gas chromatography. *Analyst (Cambridge)*, 119 (1994) 1293-1301.
- 673 Saiz-Jimenez, C., Hermosin, B. and Ortega-Calvo, J.J.: Pyrolysis/methylation: A microanalytical method for investigating polar organic compounds in cultural properties. *Intern. J. Environ. Anal. Chem.*, 56 (1994) 63-71.
- 674 Wang, Z., Fingas, M. and Sergy, G.: Study of 22-year-old Arrow oil samples using biomarker compounds by GC/MS. *Environ. Sci. Technol.*, 28 (1994) 1733-1745.

See also 183, 205, 226, 230, 233, 238, 243, 257, 285, 328, 462, 471, 480, 482, 518, 521, 535, 537, 541, 550, 551, 684.

36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

36a. Surfactants

- 675 Rasmussen, H.T., Pinto, A.M., DeMouth, M.W., Tourezky, P. and McPherson, B.P.: High temperature gas chromatography of trimethylsilyl derivatives of alcohol ethoxylates and ethoxysulfates. *J. High Resolut. Chromatogr.*, 17 (1994) 593-596.
- 676 Yamini, Y. and Ashraf-Khorassani, M.: Extraction and determination of linear alkylbenzenesulfonate detergents from the aquatic environment using a membrane disk and gas chromatography. *J. High Resolut. Chromatogr.*, 17 (1994) 634-638.

36b. *Antioxidants and preservatives*

- 677 Pfäffli, P.: Determination of low concentrations of trimellitic anhydride in air. *J. Chromatogr. A*, 684 (1994) 269-275.
- 678 Pleshkova, A.P. and Volkovich, S.V.: (Gas chromatographic-mass spectrometric identification of impurities in recycled 2-ethylhexanol of di-2-ethylhexyl phthalate plasticizer production.) *Zh. Anal. Khim.*, 48 (1993) 1999-2007.
- 679 Van Leuken, R., Mertens, M., Janssen, H.-G., Sandra, P., Kwakkenbos, G. and Deelder, R.: Optimization of capillary SFC-MS for the determination of additives in polymers. *J. High Resolut. Chromatogr.*, 17 (1994) 573-576.
- 680 Yasuhara, A.: Determination of tris(2-chloroethyl) phosphate in leachates from landfills by capillary gas chromatography using flame photometric detection. *J. Chromatogr. A*, 684 (1994) 366-369.
- See also 286, 441, 560.
- 36c. *Complex mixtures, technical products and unidentified compounds*
- 681 Anton, K., Bach, M., Berger, C., Walch, F., Jaccard, G. and Carrier, Y.: From potential to practice: Relevant industrial applications of packed-column supercritical fluid chromatography. *J. Chromatogr. Sci.*, 32 (1994) 430-438.
- 682 Breas, O., Fourel, F. and Martin, G.J.: ^{13}C Analysis of aromas and perfumes by a coupled GC-IRMS technique. The case of vanillin and leaf alcohol extracts. *Analisis*, 22 (1994) 268-272.
- 683 Buchbauer, G., Nikiforov, A. and Remberg, B.: Headspace constituents of opium. *Planta Med.*, 60 (1994) 181-183; *C.A.*, 121 (1994) 51653q.
- 684 Chiavari, G., Torsi, G., Fabbri, D. and Galletti, G.C.: Comparative study of humic substances in soil using pyrolytic techniques and other conventional chromatographic methods. *Analyst (Cambridge)*, 119 (1994) 1141-1150.
- 685 Gerard, L., Elie, M. and Landais, P.: Analysis of confined pyrolysis effluents by thermodesorption-multidimensional gas chromatography. *J. Anal. Appl. Pyrolysis*, 29 (1994) 137-152; *C.A.*, 121 (1994) 160417m.
- 686 Grob, K. and Siegrist, C.: Determination of mineral oil on jute bags by 20-50 μl splitless injection onto a 3 m capillary column. *J. High Resolut. Chromatogr.*, 17 (1994) 674-675.
- 687 Hu Guodong, Cheng Jinsong and Zhu Ye: (Quantitative determination of free organic acids in Chinese liquors.) *Chin. J. Chromatogr.*, 12 (1994) 265-267.
- 688 Kubias, B., Wolf, H. and Jacobi, B.: (Online GC analysis of the products formed in the catalytic oxidation of $n\text{-C}_4$ hydrocarbons under steady-state and non-stationary conditions.) *Chem. Tech. (Leipzig)*, 46 (1994) 63-70; *C.A.*, 121 (1994) 38003g.
- 689 Matsuyama, Y., Sakamo, T., Ohnishi, K., Fujiwara, N. and Matsuyama, K.: (Examination of several factors relative to the volatilization and fixation of perfume using headspace gas chromatography.) *J. SCCJ*, 28, No. 1 (1994) 31-37; *C.A.*, 121 (1994) 141199a.
- 690 Pruitt, D.S. and Hardy, D.R.: Analysis of reactants that lead to thermal instability deposits in aviation jet fuels. *Fuel Sci. Technol. Int.*, 12, No. 7-8 (1994) 1035-1049; *C.A.*, 121 (1994) 61029e.

691 Salz-Jimenez, C.: Analytical pyrolysis of humic substances: Pitfalls, limitations, and possible solutions. *Environ. Sci. Technol.*, 28 (1994) 1773-1780.

692 Sommerville, B.A., McCormick, J.P. and Broom, D.M.: Analysis of human sweat volatiles: an example of pattern recognition in the analysis and interpretation of gas chromatograms. *Pestic. Sci.*, 41 (1994) 365-368; *C.A.*, 121 (1994) 152473m.

693 Srinivasan, S.K. and Reddy, G.O.: GC-MS analysis of the nitration products in the preparation of the nitro musk. *Indian Perfum.*, 37 (1993) 344-363; *C.A.*, 121 (1994) 141198z.

694 Takekoshi, Y., Mitsui, T., Kanno, S., Kawase, S., Kiho, T. and Ukai, S.: (Determination of blending ratio cotton and polyester blended yarn by means of multivariate analysis of acid-catalysed pyrolysis gas chromatography data.) *Jpn. J. Toxicol. Environ. Health*, 40 (1994) 55-60; *C.A.*, 120 (1994) 317414n.

695 Xie, K.-C., Li, W.-Y. and Zhu, S.-Y.: Pyrolysis studies on coal macerals using DTA-GC, ^{13}C -NMR and SEM techniques. *Fuel Sci. Technol. Int.*, 12 (1994) 1159-1168; *C.A.*, 121 (1994) 160526w.

See also 23, 30, 140, 149, 199, 200, 206, 210, 218, 219, 224, 252, 262, 264, 265, 267, 268, 287, 309, 343, 349, 358, 373, 404, 436, 441, 489, 638.

37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES

696 Salvadores, M.P., Diaz, M.E. and Cardell, E.: (Autochthonous yeasts isolated in Tenerife wines and their influence on ethyl acetate and higher alcohol concentrations analyzed by gas chromatography.) *Microbiologia (Madrid)*, 9, No. 2 (1993) 107-112; *C.A.*, 121 (1994) 53573n.

See also 339, 387.

38. INORGANIC COMPOUNDS

38b. Anions

697 Cui, X., Wang, Z., Xu, G. and Jia, Y.: (Determination of bromide concentration in seawater by gas chromatographic method.) *Haiyang Yu Huzhao*, 24 (1993) 414-419; *C.A.*, 121 (1994) 65070j.

698 Kage, S., Nagata, T. and Kudo, K.: (Determination of cyanide in blood by GC-ECD and GC-MS.) *Hochudoku*, 12 (1994) 130-131; *C.A.*, 121 (1994) 101388e.

699 Odoul, M., Fouillet, B., Nouri, B., Chambon, R. and Chambon, P.: Specific determination of cyanide in blood by headspace gas chromatography. *J. Anal. Toxicol.*, 18 (1994) 205-207; *C.A.*, 121 (1994) 101360q.

See also 75.

38c. Permanent and rare gases

- 700 Cardeal, Z.L., Pradeau, D. and Hamon, M.: (Analysis of carbon monoxide and hydrocyanic acid by gas chromatography using chemical generators for standardization.) *Ann. Falsif. Expert. Chim. Toxicol.*, 87, No. 925 (1994) 49-63; C.A., 121 (1994) 101338p.
- 701 Gao, X.: (Gas chromatography-flame ionization device for detection of microquantity oxygen.) *Faming Zhuanli Shenqing Gongkai Shuomingsu*, CN 1,080,724 [Cl. G01N30/02], 12 Jan. 1994, Appl. 92,104,833, 22 Jun. 1992; 7 pp.; C.A., 120 (1994) 337993d.
- 702 Lechner-Fish, T.J., Lund, M.J. and Ryder, S.L.: Analysis of highly reactive process streams using multidimensional GC. *Int. Lab.*, 24, No. 8 (1994) 4-10.
- 703 Nagamine, K.: Origin and coseismic behavior of mineral spring gas at Byakko, Japan, studied by automated gas chromatographic analyses. *Chem. Geol.*, 114 (1994) 3-17; C.A., 121 (1994) 14315k.
- 704 Shinozaki, T., Tsunemi, A., Isomura, S., Nagasaka, K. and Tashiro, H.: (Measurements of the ortho-para ratio in the para-hydrogen Raman laser by gas chromatography.) *Reza Kagaku Kenkyu*, 15 (1993) 85-87; C.A., 121 (1994) 25754d.

See also 27, 70, 86, 92, 199, 710, 716.

38d. Volatile inorganic compounds

- 705 Arakelyan, V.G.: (Gas chromatography in diagnostic of high-voltage equipment.) *Elektrotehnika*, 2 (1994) 8-17; C.A., 121 (1994) 72759u.
- 706 Burdge, J.R., Cai, Z., Papillon, J. and Farwell, S.: A novel focusing injection technique for chemiluminescent detection of volatile sulfur compounds separated by HRGC. *J. High Resolut. Chromatogr.*, 17 (1994) 695-699.
- 707 Fu, Z., Feng, D., Ren, J., Wu, M. and Xie, X.: (Determination of trace iodine in table salt by head space gas chromatography.) *Zhonghua Yufang Yixue Zazhi*, 28, No. 1 (1994) 44-46; C.A., 121 (1994) 107027h.
- 708 Fujiwara, Y., Tosaka, S. and Ito, T.: (A method of NO_x analysis using small quantities sample gas.) *Kenkyu Kiyo - Hokkaido Kogyo Daigaku*, 22 (1994) 75-82; C.A., 121 (1994) 116350k.

- 709 Kadkhodayan, B.: Online gas chromatographic studies of rutherfordium (element 104), hahnium (element 105) and homologs. Avail. *Univ. Microfilms Int.*, Order No. DA9408023, 1993, 176 pp.; C.A., 121 (1994) 25720q.
- 710 Lechner-Fish, T.J., Lund, M.J. and Ryder, S.L.: Analysis of highly reactive process streams using multidimensional GC. *Am. Lab. (Shelton)*, 26 (1994) 28S-28W.
- 711 Leone, A.M., Gustafsson, L.E., Francis, P.L., Persson, M.G., Wiklund, N.P. and Moncada, S.: Nitric oxide is present in exhaled breath in humans: direct GC-MS confirmation. *Biochem. Biophys. Res. Commun.*, 201 (1994) 883-887; C.A., 121 (1994) 31679z.
- 712 Nishizawa, T.: (Analysis of gas in a liquid.) *Jpn. Kokai Tokkyo Koho* JP 05,264,526 [93,264,526] [Cl. G01N30/04], 12 Oct. 1993, Appl. 92/64,363, 23 Mar. 1992, 4 pp.; C.A., 120 (1994) 338126k.
- 713 Wang, G., Cao, Y., Jiang, X. and Xian, Y.: (Determination of phosphine in air by flame-photometric gas chromatography.) *Weisheng Yanjiu*, 23, No. 2 (1994) 65-67; C.A., 121 (1994) 116336k.
- 714 Yu, A., Yang, G., Wang, R. and Jin, Q.: (A new method for on-site determination of carbon dioxide in air.) *Gaodeng Xuexiao Huaxue Xuebao*, 15, No. 1 (1994) 47-48; C.A., 121 (1994) 16773g.

See also 27, 36, 38, 92, 481, 700, 702.

39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

- 715 Leclerc, F., Deruaz, D., Bannier, A. and Brazier, J.L.: Limit of detection of ¹³C using an atomic emission detector (MIP) coupled to gas chromatography. *Anal. Lett.*, 27 (1994) 1325-1338.
- 716 Sohns, E., Gerling, P. and Faber, E.: Improved stable nitrogen isotope ratio measurements of natural gases. *Anal. Chem.*, 66 (1994) 2614-2620.

See also 38, 130, 363.