

Gas Chromatography

1. REVIEWS AND BOOKS

- 1 Schoenmakers, P., Blomberg, J. and Kerkvliet, S.: Sophisticated separation methods and the oil industry. *LC-GC Int.*, 9 (1996) 718-725.
- 2 Tranchant, J.: *Manuel Pratique de Chromatographie en Phase Gazeuse*. Masson, Paris, Milan, Barcelone, 1995, 700 pp.

See also 41, 85, 103, 110, 192, 423, 431, 432.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 3 Bobleter, O.: Exhibition of the first gas chromatographic work of Erika Cremer and Fritz Prior. *Chromatographia*, 43 (1996) 444-446.
- 4 Collet, J.F., Rasclé, M. and Dieudonne, J.A.: Convergence of the relaxation approximation to a scalar nonlinear hyperbolic equation arising in chromatography. *ZAMP*, 47 (1996) 400-409; *C.A.*, 125 (1996) 131006d.
- 5 Didaoui, L., Touabet, A. and Meklati, B.Y.: Effect of high temperature in determination of the mathematical dead time and the constants of the *n*-alkane retention time curve in gas chromatography. *J. High Resolut. Chromatogr.*, 19 (1996) 543-548.
- 6 Ettre, L.S. and Hinshaw, J.V.: The physical meaning of the corrected retention volume. *Chromatographia*, 43 (1996) 159-162.
- 7 Lahiri, S., Roberts, R.S. and Elling, J.W.: Algorithms for the qualitative assessment of gas chromatograms. *J. Chromatogr. Sci.*, 34 (1996) 505-512.
- 8 Schurig V.: Emanuel Gil-Av. *J. High Resolut. Chromatogr.*, 19 (1996) 462-463.

2b. Thermodynamics and theoretical relationships

- 9 Berezkin, V.G., Korolev, A.A. and Malyukova, I.V.: Pressure effect on relative retention in capillary gas-liquid chromatography. *J. Microcolumn Sep.*, 8 (1996) 389-396.
- 10 Berezkin, V.G., Malyukova, I.V. and Alishoev, V.R.: (Investigation of the role of a carrier gas in capillary gas-solid chromatography). *Izv. Akad. Nauk, Ser. Khim.*, No. 3 (1996) 627-633; *C.A.*, 125 (1996) 184465j.
- 11 Le Vent, S.: Homologous series methods for determining hold-up parameters in isothermal gas chromatography. *J. Chromatogr. A*, 752 (1996) 173-181.

See also 74, 97, 130.

2c. Relationship between structure and chromatographic behaviour

- 12 Chen, J., Zhang, J., Wang, L. and Zhang, L.: (Studies on universal database of gas chromatography retention index. III. Conversion of retention index under different column temperature conditions). *Sepu*, 14 (1996) 323-326.
- 13 Dietz, E.A., Jr.: Shifting of gas chromatographic retention times due to solvent effects - a study using sulfur chemiluminescence detection. *J. High Resolut. Chromatogr.*, 19 (1996) 485-491.
- 14 Gautzsch, R. and Zinn, P.: Use of incremental models to estimate the retention indexes of aromatic compounds. *Chromatographia*, 43 (1996) 163-176.
- 15 Komina, L.I., Reznikov, S.A. and Sidorov, R.I.: (Effect of intermolecular association on the polar retention on organic compounds in gas-liquid chromatography). *Zh. Fiz. Khim.*, 70 (1996) 538-541.
- 16 Orav, A. and Kailas, T.: Correlation equations describing retention index data for *n*-alkylcyclopentenes, *n*-alkylcyclohexenes and *n*-alkyl esters on OV-101, OV-225 and PEG 20M. *Chromatographia*, 43 (1996) 557-558.
- 17 Su, H., Wu, N. and Shi, W.: (Correlation between molar response values and topological indices). *Sepu*, 14 (1996) 377-378.
- 18 Yang, W. and Chen, B.: (Studies on the method of determination of Kovats retention indexes of alkylbenzene with high reproducibility). *Fenxi Huaxue*, 24 (1996) 862; *C.A.*, 125 (1996) 119056n.

See also 71, 169, 294.

2d. Measurement of physico-chemical and related values

- 19 Abe, H., Sasaki, A., Shoji, K., Yasuhara, F. and Yamaguchi, S.: (Studies on esterification with GLC for teaching materials. 3. The steric effect of alcohol isomers for the rate of esterification). *Kagaku to Kyoiku*, 44 (1996) 391-393; *C.A.*, 125 (1996) 166788n.
- 20 Bate, D.M. and Lehrle, R.S.: Kinetic measurements by pyrolysis-gas chromatography, and examples of their use in deducing mechanisms. *Polym. Degrad. Stab.*, 53 (1996) 39-44.
- 21 Dernovaya, L.I. and El'tekov, Y.A.: (Adsorption properties of a glucose-modified silica surface). *Zh. Fiz. Khim.*, 70 (1996) 728-732.
- 22 Donovan, S.F.: New method for estimating vapor pressure by the use of gas chromatography. *J. Chromatogr. A*, 749 (1996) 123-129.
- 23 Gorbachuk, V.V. and Solomnov, B.N.: (The determination of adsorption isotherms of organic compounds on human serum albumin by static headspace gas-chromatographic analysis). *Zh. Fiz. Khim.*, 70 (1996) 723-727.
- 24 Grantz, M.: Calculation of rate constants of the basic reactions of reaction gas chromatography. Solving the differential equation system. *Forschungszent. Rossendorf, [Ber.] FZR*, 123 (1996) 108-109; *C.A.*, 125 (1996) 970111q.

- 25 Kotelnikova, T.A., Lukyanova, M.V. and Ageev, E.P.: (Sorption properties of aromatic polyamides from reverse gas chromatography data). *Vest. Mosk. Univ., Ser. 2: Khim.*, 37, No. 1 (1996) 34-41; C.A., 125 (1996) 124634d.
- 26 Lee, C.-H., Byeon, S.H. and Holder, G.D.: Adsorption characteristics of toluene and naphthalene on silica gel under the subcritical and supercritical conditions using chromatographic techniques. *J. Chem. Eng. Jpn.*, 29 (1996) 683-694.
- 27 Mason, G. and Buffham, B.A.: Gas adsorption isotherms from composition and flow-rate transient times in chromatographic columns. I. Basic theory and a binary experimental test. *Proc. R. Soc. London, Ser. A*, 452 (1996) 1263-1285; C.A., 125 (1996) 151929k.
- 28 Mason, G. and Buffham, B.A.: Gas adsorption isotherms from composition and flow-rate transient times in chromatographic columns. II. Effect of pressure changes. *Proc. R. Soc. London, Ser. A*, 452 (1996) 1287-1300; C.A., 125 (1996) 151930d.
- 29 Parcher, J.F. and Yun, K.S.: Gas chromatographic measurement of void volume and mobile-phase volume: illustration of the concepts of excess and total adsorption. *J. Chem. Educ.*, 73 (1996) 894-898; C.A., 125 (1996) 194591m.
- 30 Roshchina, T.M., Gurevich, K.B., Davydov, V.Y. and Mandrugina, A.A.: (Thermodynamic characteristics of the adsorption of organic compounds on modified silica gels). *Vest. Mosk. Univ., Ser. 2: Khim.*, 37, No. 1 (1996) 42-45; C.A., 125 (1996) 124635e.
- 31 Shekurov, V.N. and Berzhnoi, A.N.: (Chromatographic measurements of inter-diffusion coefficients for vapors of liquids into helium and argon). *Zh. Fiz. Khim.*, 70 (1996) 374-375.
- 32 Shojaee-Moradie, F., Jackson, N.C., Jones, R.H., Mallet, A.I., Hovaorka, R. and Umpleby, A.M.: Quantitative measurement of 3-O-methyl-D-glucose by gas chromatography-mass spectrometry as a measure of glucose transport *in vivo*. *J. Mass Spectrom.*, 31 (1996) 961-966.
- 33 Ste-Marie, L., Boismenu, D., Vachon, L. and Montgomery, J.: Evaluation of sodium 4-hydroxybenzoate as a hydrogen radical trap using gas chromatography-mass spectrometry and high-performance liquid chromatography with electrochemical detection. *Anal. Biochem.*, 241 (1996) 67-74.
- 34 Ticehurst, M.D., York, P., Rowe, R.C. and Dwivedi, S.K.: Characterization of the surface properties of α -lactose monohydrate with inverse gas chromatography, used to detect batch variation. *Int. J. Pharm.*, 141 (1996) 93-99.
- 35 Vahle, A., Heubener, S., Dressler, R., Eichler, B. and Teurler, A.: Monte Carlo simulation of reaction gas chromatography of group 6 elements. *Forschungszent. Rossendorf (Ber.)*, FZR, 123 (1996) 99-100; C.A., 125 (1996) 103594a.
- 36 Zhang, WeiBing, Xu, GouWang, Yang, L., Shi, JingJiang, Zhang, YuKui. and Lu, PeiZhang.: (Theoretical study of dynamic process in GC - effect of column pressure on elution profile). *Huaxue Xuebao*, 54 (1996) 605-612; C.A., 125 (1996) 184449g.
3. GENERAL TECHNIQUES
- 3a. Apparatus and accessories
- 37 Anderegg, H.: (Validation and control of GC devices). *Schweiz. Lab.-Z.*, 53 (1996) 220-224; C.A., 125 (1996) 236949s.
- 38 Bente, H.B. and Przybylski, T.M.: (Starting up a gas chromatograph anew after an interruption in the operation). *Ger. Offen.* DE 19,529,488 (Cl. G01N30/04), 25 Jul. 1996, US Appl. 376,608, 23 Jan. 1995; 8 pp.; C.A., 125 (1996) 131210r.
- 39 Borgerding, A.J. and Wilkerson, C.W., Jr.: A comparison of cryofocusing injectors for gas sampling and analysis in fast GC. *Anal. Chem.*, 68 (1996) 2874-2878.
- 40 Grob, K.: Capillary GC advances: Large-volume injection and online LC-GC. *Methodol. Surv. Bioanal. Drugs*, 24 (1996) 256-253; C.A., 125 (1996) 264600q.
- 41 Grob, K. and Biedermann, M.: Vaporising system for large volume injection or on-line transfer into gas chromatography: classification, critical remarks and suggestions. *J. Chromatogr. A*, 750 (1996) 11-23 - a review with 45 refs.
- 42 Guo, W., Yang, G., Hu, L. and Yao, X.: The study of submicroparticle packed column. *Microchem. J.*, 54 (1996) 19-31.
- 43 Helmig, D.: Gas concentration and injection system for chromatographic analysis of organic trace gases. *PCT Int. Appl.* WO 96 21,152 (Cl. G01N30/08), 11 Jul. 1996, US Appl. 369,411, 6 Jan. 1995; 14 pp.; C.A., 125 (1996) 184487t.
- 44 Johnson, P.H.: Fixed-volume injector with backflush capability. *PCT Int. Appl.* WO 96 27,792 (Cl. G01N30/20), 12 Sep. 1996, US Appl. 398,243, 3 Mar. 1995; 54 pp.; C.A., 125 (1996) 264548d.
- 45 Karpe, P., Kirchner, S. and Rouxel, P.: (Gas chromatograph for simultaneously analyzing multiple components of a gas). *FR. Demande* FR 2,730,061 (Cl. G01N30/16), 2 Aug. 1996, Appl. 95/1,082, 31 Jan. 1995; 23 pp.; C.A., 125 (1996) 229389f.
- 46 Li, W.C. and Andrews, A.R.J.: A modified inlet system for high speed gas chromatography using inert metal tubing with a carbon dioxide cooled cryotrap. *J. High Resolut. Chromatogr.*, 19 (1996) 492-496.
- 47 Lin, J., Wang, W., Murphy, M.C. and Overton, E.: A bond graph model for the sample extraction/injection system of a micro-sized gas chromatographic instrument. *Rev. Sci. Instrum.*, 67 (1996) 3252-3259.
- 48 Ootsuki, S., Ooya, T. and Tomita, K.: (Temperature control oven for gas chromatographic columns). *Jpn. Kokkai Tokkyo Koho JP 08,160,026* [96,160,026] (Cl. G01N30/54) 21 Jun. 1996, Appl. 94/329,867, 4 Dec. 1994; 4 pp.; C.A., 125 (1996) 184383f.
- 49 Shoji, M.: (Gas chromatograph). *Jpn. Kokkai Tokkyo Koho JP 08,145,976* [96,145,976] (Cl. G01N30/86), 7 Jun. 1996, Appl. 94/315,645, 24 Nov. 1994; 5 pp.; C.A., 125 (1996) 131305a.
- 50 Tena, M.T. and Valcárcel, M.: Fiber optic-based interface for on-line selective photometric determinations in solid samples by supercritical fluid extraction. *J. Chromatogr. A*, 753 (1996) 299-305.
- 51 Tong, D., Barnes, A.M., Bartle, K.D. and Clifford, A.A.: Valve injection for gas chromatographic analysis on small-bore open tubular columns. *J. Microcolumn Separ.*, 8 (1996) 353-359.

See also 96, 121, 185, 277, 360, 399, 469.

- 52 Umeda, M.: (Gas analyzer for combustion gas analysis). *Jpn. Kokai Tokkyo Koho* JP 08,122,317 [96,122,317] (Cl. G01N30/72), 17 May 1996, Appl. 94/287,293, 27 Oct. 1994; 3 pp.; C.A., 125 (1996) 103732u.
- 53 Walters, H.L., Allington, R.W., Jameson, D.G. and Tehrani, Y.: Apparatus and method for supercritical fluid extraction or supercritical fluid chromatography. *Eur. Pat. Appl.* EP 724,901 (Cl. B01D11/02), 7 Aug. 1996, US Appl. 382,650, 2 Feb. 1995; 58 pp.; C.A., 125 (1996) 171715r.

See also 128, 135, 316, 330, 390, 459.

3b. Detectors and detection reagents

- 54 Beckmann, M. and Reuttinger, H.-H.: (Ionization detector for gas chromatography). *Ger. Offen.* DE 19,502,285 (Cl. G01N30/68), 8 Aug. 1996, Appl. 19,502,285, 26 Jan. 1995; 6 pp.; C.A., 125 (1996) 184489v.
- 55 Holm, T. and Madsen, J.O.: Methane formation by flame-generated hydrogen atoms in the flame ionization detector. *Anal. Chem.*, 68 (1996) 3607-3611.
- 56 Kishi, H. and Fujii, T.: A surface ionization detector for gas chromatography: use of a supersonic free jet. *Anal. Chem.*, 68 (1996) 2776-2781.
- 57 Kishi, H., Fujii, T. and Sato, G.: Surface ionization detector with a supersonic free jet for gas chromatography. Some applications. *J. Chromatogr. A*, 750 (1996) 335-340.
- 58 Lavigne-Delcroix, A., Tusseau, D. and Proix, M.: (Validation of a chromatographic chemiluminescence detector). *Sci. Aliments*, 16 (1996) 267-280; C.A., 125 (1996) 193797s.
- 59 Leonhardt, J., Bensch, H., Berger, D. and Eckert, B.: (Ion-mobility spectrometer with internal gas-chromatography columns). *Ger. Offen.* DE 19,502,674 (Cl. G01N30/72), 12 Sep. 1996, Appl. 19,502,674, 20 Jan. 1995; 8 pp.; C.A., 125 (1996) 237092u.
- 60 Lin, Z.-P. and Aue, W.A.: Filterless, full spectral range, compound-specific detection in dualchannel photometry. *J. Chromatogr. A*, 742 (1996) 143-149.
- 61 Lo, C.K.: Flame ionization detector with flame tip on diffuser. *Eur. Pat. Appl.* EP 723,154 (Cl. G01N30/68), 24 Jul. 1996, US Appl. 375,330, 17 Jan. 1995; 11 pp.; C.A., 125 (1996) 157264m.
- 62 Mendonca, S., Wentworth, W.E., Chen, E.C.M. and Stearns, S.D.: Relative responses of various classes of compounds using a pulsed discharge helium photoionization detector. Experimental determination and theoretical calculations. *J. Chromatogr. A*, 749 (1996) 131-148.
- 63 Meng, C.: Method and apparatus for preserving the sensitivity of a thermionic ionization detector. *Eur. Pat. Appl.* EP 723,151 (Cl. G01N30/68), 24 Jul. 1996, US Appl. 375,019, 19 Jan. 1995, 15 pp.; C.A., 125 (1996) 157396f.
- 64 Singh, H. and Aue, W.A.: Accurate spectral scans of single chromatographic peaks. *J. Chromatogr. A*, 746 (1996) 43-51.
- 65 Stearns, S.D. and Wentworth, W.E.: Photoionization detector incorporating a dopant and carrier gas flow. *U.S. Pat.* 5,541,519 (Cl. 324-464; G01N27/62), 30 Jul. 1996, US Appl. 662,149, 28 Feb. 1991; 10 pp.; C.A., 125 (1996) 184392h.
- 66 Thurbide, K.B., Wentzell, P.D. and Aue, W.A.: Acoustic flame detector for gas chromatography. *Anal. Chem.*, 68 (1996) 2758-2765.
- 67 Wentworth, W.E., Huang, J., Chen, E.C.M. and Stearns, S.D.: Operating the pulsed discharged detector in both the electron-capture and photoionization modes within the same GC analysis. *Chromatographia*, 43 (1996) 353-360.
- 68 Wentworth, W.E., Wang, Y., Odegard, W., Chen, E.C.M. and Stearns, S.D.: Pulsed-discharge electron-capture detector: kinetic model, response factors, and temperature dependence. *J. Chromatogr. Sci.*, 34 (1996) 368-375.
- 69 Wentworth, W.E., Watanesk, S., Helias, N., Swatloski, R., Chen, E.C.M. and Stearns, S.D.: Experimental and theoretical relative response factors for a pulsed discharge krypton photoionization detector. *J. Chromatogr. A*, 749 (1996) 149-155.

See also 13, 50, 158, 287, 288, 369, 424, 494.

3c. Sorbents and columns, packing procedures

- 70 Betschinger, F., Libman, J. and Shanzer, A.: Gas chromatographic enantiomer separation on a chiral selfassociating selector. *J. Chromatogr. A*, 746 (1996) 53-62.
- 71 Betts, T.J.: Plots of relative retention against solute boiling point indicate extra solute interactions with a liquid crystal polysiloxane stationary phase. *J. Chromatogr. A*, 743 (1996) 341-346.
- 72 Bicchi, C., D'Amato, A., Manzin, V., Galli, A. and Galli, M.: Cyclodextrin derivatives in the gas chromatographic separation of racemic mixtures of volatile compounds. X. 2,3-Di-O-ethyl-6-O-tert.-butyldimethylsilyl- β - and - γ -cyclodextrins. *J. Chromatogr. A*, 742 (1996) 161-173.
- 73 Bulanova, A.V.: (Effect of pressure on the retention of substances in gas chromatography). *Dokl. Akad. Nauk*, 348 (1996) 772-773; C.A., 125 (1996) 257850t.
- 74 Castello, G., Vezzani, S. and Moretti, P.: Comparison of the behaviour of gas-liquid and gas-liquid-solid capillary columns through the determination of thermodynamic characteristics. *J. Chromatogr. A*, 742 (1996) 151-160.
- 75 Garcia, K.E., Medvedovici, A., Ferraz, V. and Sandra, P.: Fast chiral separation by microbore SFC on the 3,5-dimethylphenyl carbamate derivative of cellulose. *J. High Resolut. Chromatogr.*, 19 (1996) 569-570.
- 76 Ho, C.-C. and Liu, C.-Y.: Metallomesogens as stationary phases for ligand exchange gas chromatography - Part I. The use of nickel and zinc complex of 4-decanoxydithiobenzoic acid for the separation of polycyclic aromatic hydrocarbons and dialkyl sulfides. *Anal. Chim. Acta*, 332 (1996) 23-30.
- 77 Husain, S., Sarma, P.N., Lakshmi, V.V.S. and Rao, K.S.R.: Evaluation of stearyl-1- α -naphthyl acetate as a stationary phase for gas-liquid chromatography. *Indian J. Chem. Technol.*, 3 (1996) 234-236; C.A., 125 (1996) 157337n.
- 78 Jing, P., Fu, R., Zhou, W., Dai, R., Huang, Z. and Chen, Y.: Unusual behaviour of a new kind of side chain crown ether polysiloxanes used in capillary gas chromatography. *J. Chromatogr. A*, 752 (1996) 189-195.
- 79 Jing, P., Fu, R.-N., Dai, R.-J., Ge, J.-L., Gu, J.-L., Huang, Z. and Chen, Y.: Consequence of diluting modified β -cyclodextrins in a side-chain crown ether polysiloxane and in a side-chain liquid-crystalline polysiloxane-containing crown ether as stationary phases in capillary gas chromatography. *Chromatographia*, 43 (1996) 546-550.

- 80 Lefebvre, D.A., Lansbarkis, J.R. and Semerdjian, R.V.: Rigid silica capillary column for use in chromatography. *Eur. Pat. Appl.*, EP 729,028 (Cl. G01N30/60), 28 Aug. 1996, US Appl. 394,127, 24 Feb. 1995; 8 pp.; C.A., 125 (1996) 237082r.
- 81 Lei, G., Ni, X. and Yuan, G.: (Preparation of SE-52 crosslinked capillary column). *Xibei Daxue Xuebao, Ziran Kexueban*, 26 (1996) 41-43; C.A., 125 (1996) 157341j.
- 82 Lu, X.-M., Yun, X.-Q., Zhang, C.-S., Kou, D.-M., Fu, C.-X., Xiang, S.-H. and Li, H.-X.: A study on the preparation and characteristics of zeolite membrane PLOT column by in-situ synthesis. *Chromatographia*, 43 (1996) 211-214.
- 83 Maerker, B. and Ballschmiter, K.: Cyclodextrin- and sugar-derivatives as stationary phases for the gas chromatography of semivolatiles. *Fresenius J. Anal. Chem.*, 356 (1996) 98-99.
- 84 Meddour, A., Courtieu, J., Abdelhadi, W., Guermouche, S. and Guermouche, M.H.: Gas chromatographic properties of two thermotropic poly(L-glutamates) with long alkyl side chains. *Chromatographia*, 43 (1996) 387-392.
- 85 Nabivach, V.M.: (Organoclays in gas-chromatographic analysis of byproduct coking products). *Koks Khim.*, No. 4 (1995) 17-25; C.A., 125 (1996) 200134h - a review with 72 refs.
- 86 Park, J.H. and Weon, Y.C.: Gas chromatographic characterization of silica-based reversed-phase sorbents for solid phase extraction. *Anal. Sci.*, 12 (1996) 733-737.
- 87 Perez, F., Berdague, P., Courtieu, J., Bayle, J.P., Boudah, S. and Guermouche, M.H.: Comparison of two azobenzene liquid crystal stationary phases in open tubular column gas chromatography. *J. Chromatogr. A*, 746 (1996) 247-254.
- 88 Reese, S.: The care and maintenance of capillary GC columns. *LC-GC Int.*, 9 (1996) 726-731.
- 89 Reinhardt, R., Richter, M., Mager, P.P., Hennig, P. and Engewald, W.: Investigation of gas chromatographic interaction mechanism on permethylated cyclodextrins by molecular modelling. *Chromatographia*, 43 (1996) 187-194.
- 90 Shariff, S.M., Robson, M.M., Bartle, K.D., Myers, P. and Clifford, A.A.: Use of liquid chromatography packings in high pressure gas chromatography. *J. High Resolut. Chromatogr.*, 19 (1996) 527-529.
- 91 Watson, J.M. and Persaud, K.C.: Method for depositing a conducting polymer into a tube by vapor phase chemical oxidation and its use as chromatography column. *PCT Int. Appl.* WO 96 16,331 (Cl. G01N30/56), 30 May 1996, GB Appl. 94/23,269, 18 Nov. 1994; 25 pp.; C.A., 125 (1996) 103900x.
- 92 Williams, K.L., Sander, L.C. and Wise, S.A.: Use of a naphthylethylcarbamoylated- β -cyclodextrin chiral stationary phase for the separation of drug enantiomers and related compounds by sub- and supercritical fluid chromatography. *Chirality*, 8 (1996) 325-331.
- 93 Yang, Y., Liu, H. and Shen, X.: (Investigation of modifier polymer PLOT column with polar liquid phases). *Sepu*, 14 (1996) 381-384.
- 94 Zhang, W., Xu, G., Zhang, Y., Shik, J. and Lu, P.: (Theoretical study on the new type of two-dimensional packed-capillary column GC system. (II). Effect of column conditions on column efficiency). *Gaodeng Xuexiao Huaxue Xuebao*, 17 (1996) 1039-1043; C.A., 125 (1996) 237148s.
- 95 Zhou, X.-C., Yan, H., Chen, Y.-Y., Wu, C.-Y. and Lu, X.-R.: Chiral crown ether-anchored polysiloxanes as capillary gas chromatography stationary phases. *J. Chromatogr. A*, 753 (1996) 269-277.
- See also 122, 123, 125, 126, 133, 134, 136, 267, 283, 451.
- 3d. *Quantitative analysis*
- 96 Bressolle, F., Bromet-Petit, M. and Audran, M.: Validation of liquid chromatographic and gas chromatographic methods. Application to pharmacokinetics. *J. Chromatogr. B*, 686 (1996) 3-10.
- See also 108, 170, 293.
- 3f. *Programmed temperature, pressure, vapors, gradients*
- 97 Hawkes, S.J.: Extrapolating programmed gas chromatographic data from one set of conditions to another. *J. Chromatogr. A*, 746 (1996) 282-285.
- 98 Hawkes, S.J.: Programmed temperature gas chromatographic data from isothermal retention indices. *J. Chromatogr. A*, 753 (1996) 147-150.
- 99 Richmond, R.: Calibrated salvage of gas chromatography capillary column retention indices. *J. Chromatogr. A*, 742 (1996) 131-134.
- 100 Sinsheimer, J.E., Counsell, R.E., Cai, W., Gopalswamy, R., Mahalakshmi, P., Pineriro-Sanchez, M.L., Ruangwises, N. and Schteingart, D.E.: Gas chromatographic-electron capture detection of 2,4'-dichlorodiphenylacetic acid from *in-vitro* adrenal transformations of mitotane and its analogs. *J. Pharm. Biomed. Anal.*, 14 (1996) 861-866.
- 101 Wang, Q.-S., Zhu, C.-S., Yan, B.-W. and Zhang, Z.-C.: Computer-assisted optimization of temperature programming and flow rate in capillary gas chromatography. *Sepu*, 14 (1996) 217-221.
4. SPECIAL TECHNIQUES
- 4a. *Automation*
- 102 Bengtsson, I.M. and Lehotay, D.C.: Sample preparation with an automated robotic workstation for organic acid analysis by gas chromatography-mass spectrometry. *J. Chromatogr. B*, 685 (1996) 1-7.
- 103 De Boer, J.H. and Kenter, R.: (Control methods for online field gas chromatographs). *GWF, Gas-Wasserfach: Gas/Erdgas*, 137 (1996) 296-301; C.A., 125 (1996) 200151m - a review with 4 refs.
- 104 Jakob, E., Huai, H., Nie, X. and Meuzelaar, H.L.C.: Online GC-MS techniques for monitoring high-pressure conversion reactions. *Process Control Qual.*, 8, No. 2-3 (1996) 55-67; C.A., 125 (1996) 226340x.
- 105 Kozin, E.S., Chernoyarov, A.N. and Tokareva, O.S.: (Automated system for gas chromatography). *Prib. Sist. Upr.*, No. 7 (1996) 23-26.
- 4b. *Computerization and modelling*
- 106 Koel, M. and Kaljurand, M.: Computerized multiple-input chromatographic analysis of time-varying substance flows. *Crit. Rev. Anal. Chem.*, 26 (1996) 149-194.

See also 101.

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

- 107 Demir, C., Hindmarch, P. and Breton, R.G.: Procrustes analysis for the determination of number of significant masses in gas chromatography-mass spectrometry. *Analyst (Cambridge)*, 121 (1996) 1443-1449.
- 108 Hindmarch, P., Demir, C. and Breton, R.G.: Deconvolution and spectral clean-up of two-component mixtures by factor analysis of gas chromatographic-mass spectrometric data. *Analyst (Cambridge)*, 121 (1996) 993-1001.
- 109 Iida, J.: (GC-MS apparatus using selective ion monitoring method). *Jpn. Kokai Tokkyo Koho JP 08,129,002 [96,129,002] (Cl. G01N30/72)*, 21 May 1996, Appl. 94/292,301, 31 Oct. 1994; 7 pp.; C.A., 125 (1996) 103759h.
- 110 Ikuta, M.: (Application of GC-AED for analysis of organic chlorine compounds). *Idemitsu Giho*, 39 (1996) 192-196; C.A., 125 (1996) 103818b.
- 111 Konieczka, P., Wolska, L., Luboch, E., Namiesnik, J., Przyjazny, A. and Biernat, J.F.: Calibration of the thermal desorption-gas chromatography-mass spectrometry system using standards generated in the process of thermal decomposition of chemically modified silica gel. *J. Chromatogr. A*, 742 (1996) 175-179.
- 112 Liu, H., Tang, Y., Huang, A. and Sun, Y.: (Problems related to the gas chromatographic qualitative analysis using mass spectrometry and retention value measurement). *Sepu*, 14 (1996) 331-333.
- 113 Lou, X., Janssen, H.-G. and Cramers, C.A.: Investigation of parameters affecting the on-line combination of supercritical fluid extraction with capillary gas chromatography. *J. Chromatogr. A*, 750 (1996) 215-226.
- 114 Meier-Augenstein, W., Watt, P.W. and Langhans, C.-D.: Influence of gas chromatographic parameters on measurement of $^{13}\text{C}/^{12}\text{C}$ isotope ratios by gas-liquid chromatography-combustion isotope ratio mass spectrometry. I. *J. Chromatogr. A*, 752 (1996) 233-241.
- 115 Norton, K.L., Haefner, A.M., Makishima, H., Jalsovszky, G. and Griffiths, P.R.: Comparison of direct-deposition supercritical fluid and gas chromatography/Fourier transform infrared spectra to condensed-phase library spectra. *Appl. Spectrosc.*, 50 (1996) 1125-1133.
- 116 Sheehan, T.L.: GC-MS-MS: The next logical step in benchtop GC-MS. *Am. Lab. (Shelton)*, 28, No. 17 (1996) 28V-28Y.
- 117 Statheropoulos, M., Smaragdīs, E., Tzamtzis, N. and Georgakopoulos, C.: Principal component analysis for resolving coeluting substances in gas chromatography-mass spectrometry doping control analysis. *Anal. Chim. Acta*, 331 (1996) 53-61.

See also 132, 174, 319.

4e. *Functional analysis*

- 118 Jander, R., Pompe, S., Bubner, M. and Heise, K.H.: Characterization of carboxylic groups in synthetic humic substances by pyrolysis gas chromatography. *Forschungszent, Rossendorf, [Ber.] FZR*, 123 (1996) 60-61; C.A., 125 (1996) 103858q.

4f. *Trace analysis and preseparation techniques*

- 119 Burger, B.V., Burger, W.J.G. and Burger, I.: Trace determination of volatile organic compounds in water using permeation through a hollow fiber membrane and carrier gas stripping. *J. High Resolut. Chromatogr.*, 19 (1996) 571-576.
- 120 Capangpangan, M.B., Noblet, J.A. and (Mel) Suffet, I.H.: Evaluation of selected filters for collection and subsequent supercritical fluid extraction of suspended solids for trace organic analysis. *J. Chromatogr. A*, 753 (1996) 279-290.
- 121 Souchon, I., Rojas, J.A., Voilley, A. and Grevillot, G.: Trapping of aromatic compounds by adsorption on hydrophobic sorbents. *Separ. Sci. Technol.*, 31 (1996) 2473-2491.

See also 86, 156, 458.

4g. *Enantiomers, separation*

- 122 Pirkle, W.H., Brice, L.J. and Terfloth, G.J.: Liquid and subcritical CO_2 separations of enantiomers on a broadly applicable polysiloxane chiral stationary phase. *J. Chromatogr. A*, 753 (1996) 109-119.
- 123 Zhou, X.-c., Wu, C.-y., Yan, H. and Chen, Y.-y.: Gas chromatographic enantiomeric separation on polysiloxane-anchored chiral crown ether (Chirasil-man-18C6-25). *J. High Resolut. Chromatogr.*, 19 (1996) 643-646.

See also 70, 72, 75, 92, 95, 136, 267, 272, 274, 275, 367, 426.

4h. *Other special techniques*

- 124 Berezkin, V.G.: Steam chromatography using water solutions of electrolytes as stationary liquid phases. *Am. Lab. (Shelton)*, 28, No. 17 (1996) 28C-28Q - a review with 54 refs.

See also 90.

4i. *Supercritical fluid chromatography*

- 125 Bouigeon, C., Thiebaut, D. and Caude, M.: Long packed column supercritical fluid chromatography: influence of pressure drop on apparent efficiency. *Anal. Chem.*, 68 (1996) 3622-3630.
- 126 Cantrell, G.O., Stringham, W., Blackwell, J.A., Weckwerth, J.D. and Carr, P.W.: Effect of various modifiers on selectivity in packed-column subcritical and supercritical fluid chromatography. *Anal. Chem.*, 68 (1996) 3645-3650.
- 127 Caron, I., Salvador, A., Elfakir, C., Herbreteau, B. and Dreux, M.: Analysis of partially methylated cyclodextrins by subcritical fluid and liquid chromatography. *J. Chromatogr. A*, 746 (1996) 103-108.
- 128 Heaton, D.M., Bartle, K.D., Myers, P. and Clifford, A.A.: Use of modifier as trapping fluid in preparative supercritical fluid chromatography. *J. Chromatogr. A*, 753 (1996) 306-311.
- 129 Lou, X., Janssen, H.-G., Snijders, H. and Cramers, C.A.: Pressure drop effects on selectivity and resolution in packed column supercritical fluid chromatography. *J. High Resolut. Chromatogr.*, 19 (1996) 449-456.

- 130 Pyo, D., Li, W., Lee, M.L., Weckwerth, J.D. and Carr, P.W.: Addition of methanol to the mobile phase in packed capillary column supercritical fluid chromatography. Retention mechanisms from linear solvation energy relationships. *J. Chromatogr. A*, 753 (1996) 291-298.
- 131 Robson, M.M., Roulin, S., Shariff, S.M., Raynor, M.W., Bartle, K.D., Clifford, A.A., Myers, P., Euerby, M.R. and Johnson, C.M.: Capillary electrochromatography using columns packed with a supercritical fluid carrier. *Chromatographia*, 43 (1996) 313-321.
- 132 Sandra, P., Medvedovici, A., Kot, A., Vilas Boas, L. and David, F.: SPE-SFC-DAD: a new hyphenated system for monitoring organic micropollutants in aqueous samples. *LC-GC Int.*, 9 (1996) 540-554.
- 133 Shen, Y. and Lee, M.L.: End-functionalized polyethylene oxide coated silica particles for packed capillary column supercritical fluid chromatography. *Chromatographia*, 43 (1996) 373-379.
- 134 Shen, Y. and Lee, M.L.: Silica surface interactions of diol-bonded phases in packed capillary column supercritical fluid chromatography. *J. Microcolumn Sep.*, 8 (1996) 413-420.
- 135 Strode, J.T.B. and Taylor, L.T.: Supercritical fluid extraction employing a variable restrictor coupled to gas chromatography via a sample pre-concentration trap. *J. High Resolut. Chromatogr.*, 19 (1996) 651-654.
- 136 Williams, K.L., Sander, L.C. and Wise, S.A.: Comparison of liquid and supercritical fluid chromatography using naphthylethyl-carbamoylated- β -cyclodextrin chiral stationary phases. *J. Chromatogr. A*, 746 (1996) 91-101.
- 137 Ziegler, J.W.: "It ain't misbehavin' thinspace" fundamental investigation into supercritical fluid binary mixtures containing carbon dioxide and supercritical fluid chromatography. *Diss. Abstr. Int.*, B, 57 (1996) 2534; C.A., 125 (1996) 211439n.
- See also 26, 50, 53, 92, 113, 115, 120, 122, 143, 153, 188, 199, 239, 240, 248, 293, 318, 330, 343, 371, 373, 436, 460.
5. HYDROCARBONS AND HALOGEN DERIVATIVES
- 5a. *Aliphatic hydrocarbons*
- 138 González-Barros, C., Alvarez Piñeiro, M.E., Simal Lozano, J. and Lage Yusty, M.A.: Simultaneous determination of aliphatic hydrocarbons, PCBs and PCTs in pork liver by gas chromatography. *Chromatographia*, 43 (1996) 398-400.
- 139 Mohler, E.R., III, Reaven, P., Stegner, J.E., Fineberg, N.S. and Hathaway, D.R.: Gas chromatographic method using photoionization detection for the determination of breath pentane. *J. Chromatogr. B*, 685 (1996) 201-209.
- 140 Toschi, T.G., Bendini, A. and Lercker, G.: Evaluation of 3,5-stigmastadiene content of edible oils: comparison between the traditional capillary gas chromatographic method and the on-line high performance liquid chromatography-capillary gas chromatographic analysis. *Chromatographia*, 43 (1996) 195-199.
- 141 Zhou, Y.: (High temperature gas chromatography for the distribution of carbon number of normal and isomeric alkanes in high melting waxes). *Sepu*, 14 (1996) 403-404.
- See also 16, 496.
- 5b. *Cyclic hydrocarbons, fullerenes*
- 142 Bartulewicz, J., Bartulewicz, E., Gawłowski, J. and Niedzielski, J.: Gas chromatographic determination of styrene in ambient air and emissions. *Chem. Anal. (Warsaw)*, 41 (1996) 743-752.
- 143 De Cardeal, Z., Pradeau, D. and Farinotti, R.: Analysis of polycyclic aromatic hydrocarbons by supercritical fluid chromatography using an improved binary gradient as mobile phase. *J. Braz. Chem. Soc.*, 7 (1996) 103-108.
- 144 Garasimenko, V.A. and Nabivach, V.M.: (Sorption-structure correlations for aromatic compounds under conditions of gas and liquid chromatography). *Koks Khim.*, No. 7 (1995) 12-19; C.A., 125 (1996) 200517k.
- 145 Janda, V., Fanta, J. and Vejrosta, J.: Factors affecting SFE of PAHs from water samples. *J. High Resolut. Chromatogr.*, 19 (1996) 588-590.
- 146 Kikani, B.B., Twamley, C., Crawford, J.O., Hobbib, G.C. and Rittenburg, J.H.: A comparison between an immunoassay based detection method and gas chromatography for PAH measurement. *Hydrocarbon Contam. Soils*, 4 (1994) 143-154; C.A., 125 (1996) 122602t.
- 147 Li, H., Banner, C.D., Mason, G.G., Westerholm, R.N. and Rafter, J.J.: Determination of polycyclic aromatic compounds and dioxin receptor ligands present in diesel exhaust particulate extracts. *Atmos. Environ.*, 30 (1996) 3537-3543; C.A., 125 (1996) 175945p.
- 148 Martines, C., Longo, M., Lerda, D., Ceroni, G. and Cavallaro, A.: A GC method for the quantitative determination of BTEX in gasoline. *J. Chromatogr. Sci.*, 34 (1996) 413-417.
- 149 McRae, C., Love, G.D., Murray, I.P., Snape, C.E. and Fallick, A.E.: Potential of gas chromatography isotope ratio mass spectrometry to source polycyclic aromatic hydrocarbon emissions. *Anal. Commun.*, 33 (1996) 331-333.
- 150 Moret, S., Grob, K. and Conte, L.S.: On-line high-performance liquid chromatography-solvent evaporation-high-performance liquid chromatography capillary gas chromatography-flame ionisation detection for the analysis of mineral oil polyaromatic hydrocarbons in fatty foods. *J. Chromatogr. A*, 750 (1996) 361-368.
- 151 Oda, J., Ichikawa, S. and Mori, T.: (Analysis of polycyclic aromatic hydrocarbons in airborne particulates by capillary GC/MS method with programmed temperature relative retention index). *Bunseki Kagaku*, 45 (1996) 825-835.
- 152 Schleussinger, A., Ohlmeier, B., Reiss, I. and Schulz, S.: Moisture effects on the cleanup of PAH-contaminated soil with dense carbon dioxide. *Environ. Sci. Technol.*, 30 (1996) 3199-3204.
- 153 Tan, C.-S. and Huang, C.-H.: Separation of trimethylbenzene isomers on molecular sieves 13X in high pressure carbon dioxide. *Separ. Sci. Technol.*, 31 (1996) 2011-2019.
- 154 Valor, I., Cortada, C. and Moltó, J.C.: Direct solid phase micro-extraction for the determination of BTEX in water and wastewater. *J. High Resolut. Chromatogr.*, 19 (1996) 472-474.
- 155 Wybraniec, S. and de Jong, A.P.: Modified sampling and analysis method for large volatility range airborne polycyclic aromatic hydrocarbons (PAH) using gas chromatography-mass spectrometry. *Fresenius J. Anal. Chem.*, 356 (1996) 396-402.

See also 18, 76, 188, 441, 461.

5c. Halogen derivatives

- 156 Askari, M.D.F., Maskarinec, M.P., Smith, S.M., Beam, P.M. and Travis, C.C.: Effectiveness of purge-and-trap for measurements of volatile organic compounds in aged soils. *Anal. Chem.*, 68 (1996) 3431-3433.
- 157 Borrelli, R., Fiorani, T. and Golfero, P.: Ultratrace determination of 1,2,4-trichlorobenzene in waste water by purge and trap/gas chromatography coupled to different detectors: flame ionization (FID), electron capture (ECD), and multiple ion detection-mass spectrometry (MID-MS). *J. High Resolut. Chromatogr.*, 19 (1996) 457-461.
- 158 Culbertson, J.A. and Grimsrud, E.P.: Destruction of halogenated methanes by non-electron capture process within an electron capture detector. *J. Chromatogr. A*, 742 (1996) 135-142.
- 159 Guidotti, M.: Determination of chlorobenzenes in water by microextraction and GC/MS. *J. High Resolut. Chromatogr.*, 19 (1996) 469-471.
- 160 Hino, T., Nakanishi, S. and Hobo, T.: Development of a whole headspace injection method for the determination of volatile organic compounds in water. *J. Chromatogr. A*, 746 (1996) 83-90.
- 161 James, K.J. and Stack, M.A.: The determination of volatile organic compounds in soils using solid phase microextraction with gas chromatography-mass spectrometry. *J. High Resolut. Chromatogr.*, 19 (1996) 515-519.
- 162 Kinghorn, R.M., Marriott, P.J. and Cumbers, M.: Multidimensional capillary gas chromatography of polychlorinated biphenyl marker compounds. *J. High Resolut. Chromatogr.*, 19 (1996) 622-626.
- 163 Kubátová, A., Matucha, M. and Bubner, M.: Application of ¹³C-labelled polychlorinated biphenyl congener 153 as internal standard in the gas chromatographic-mass spectrometric analysis of polychlorinated biphenyls. *J. Chromatogr. A*, 750 (1996) 245-251.
- 164 Kubátová, A., Matucha, M. and Sevcík, J.G.K.: Application of correlation analysis for identification of polychlorinated biphenyls. *J. Chromatogr. A*, 752 (1996) 197-207.
- 165 Lagomarsino, R.J.: An improved gas chromatographic method for the determination of perfluorocarbon tracers in the atmosphere. *J. Chromatogr. Sci.*, 34 (1996) 405-412.
- 166 Matz, G., Schröder, W. and Ollesch, T.: A new fast method for field screening of polychlorinated biphenyls in air. *J. Chromatogr. A*, 750 (1996) 151-153.
- 167 Maurizio, G.: (Use of solid-phase microextraction (SPME) in determination of chlorobenzenes in water samples). *Boll. Chim. Ig., Parte Sci.*, 47, No. 51 (1996) 37-38; *C.A.*, 125 (1996) 123016s.
- 168 Richardson, S.D., Thruston, A.D., Jr., Collette, T.W., Patterson, K.S., Lykins, B.W., Jr. and Ireland, J.C.: Identification of TiO₂/UV disinfection byproducts in drinking water. *Environ. Sci. Technol.*, 30 (1996) 3327-3334.
- 169 Vetter, W. and Luckas, B.: Calculation of retention times by adding the time increments of polychlorinated biphenyls. *J. Microcolumn Separ.*, 8 (1996) 317-322.

- 170 Yang, B.-z., Zurbenko, I. and Hwang, S.-a.: Statistical model for estimating measurement error in the congener-specific analysis of PCBs by gas chromatography. *Chemom. Intell. Lab. Sys.*, 34 (1996) 217-229.

See also 67, 138, 271, 327, 329, 441.

5d. Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)

- 171 Levendis, Y.A., Atal, A., Carlson, J., Dunayevskiy, Y. and Vouros, P.: Comparative study on the combustion and emissions of waste tire crumb and pulverized coal. *Environ. Sci. Technol.*, 30 (1996) 2742-2754.
- 172 Moret, S., Grob, K. and Conte, L.S.: On-line solvent evaporator for coupled systems: further developments. *J. High Resolut. Chromatogr.*, 19 (1996) 434-438.
- 173 Riis, V., Miethe, D. and Moder, M.: Analytical characterization of the persistent residues after microbial degradation of mineral oils. *Fresenius J. Anal. Chem.*, 356 (1996) 378-384.
- 174 Sepic, E., Trier, C. and Leykovsek, H.: Biodegradation studies of selected hydrocarbons from diesel oil. *Analyst (Cambridge)*, 121 (1996) 1451-1456.
- 175 Wang, Z. and Fingas, M.: Separation and characterization of petroleum hydrocarbons and surfactant in oil-in-water emulsion dispersion samples. *Environ. Sci. Technol.*, 30 (1996) 3351-3361.
- 176 You, Y. and Jin, K.: (Analysis of saturates, olefines and aromatics in gasoline with gas chromatography). *Sepu*, 14 (1996) 379-381.
- 177 Young, M.S., Mauro, D.M. and Craigie, K.W.: A microscale solvent extraction (MSE) procedure for the simultaneous determination of volatile and semivolatile petroleum hydrocarbons in soil or aqueous samples. *Hydrocarbon Contam. Soils*, 5 (1995) 179-186; *C.A.*, 125 (1996) 150158w.

See also 84, 467.

6. ALCOHOLS

- 178 Alt, A. and Reinhardt, G.: (The accuracy of blood alcohol measurement by head-space GC, ADH, and REA ethanol assay for the AXSYM system. A method comparison). *Blutalkohol*, 33 (1996) 209-214; *C.A.*, 125 (1996) 214395f.
- 179 Bartulewicz, J., Bartulewicz, E., Gawlowski, J. and Niedzielski, J.: Gas chromatographic determination of ethylene glycol in emissions. *Chem. Anal. (Warsaw)*, 41 (1996) 551-557.
- 180 Hatayama, K., Hamada, T., Nunomura, N., Abe, S., Mori, S., Seita, M. and Innami, H.: Online monitoring of ethanol concentration of shoyu moromi by process gas-chromatograph. *Nippon Shoyu Kenkyusho Zasshi*, 22 (1996) 187-193; *C.A.*, 125 (1996) 219899h.
- 181 Ito, Y., Mikami, E., Ohno, T. and Hayakawa, J.: (Interfering substance on analysis of methanol in household aerosol products and headspace gas chromatography method). *Jpn. J. Toxicol. Environ. Health*, 42 (1996) 348-353; *C.A.*, 125 (1996) 237176z.

- 182 Kadokami, K., Sato, K., Iwamura, T. and Hanada, Y.: (Determination of hydrophilic alcohols from aquatic environment by solid-phase microextraction and GC/MS). *Bunseki Kagaku*, 45 (1996) 1013-1018.
- 183 Kumazawa, T., Seno, H., Lee, X.-P., Ishii, A., Suzuki, O. and Sato, K.: Detection of ethanol in human body fluids by headspace solid-phase micro extraction (SPME)/capillary gas chromatography. *Chromatographia*, 43 (1996) 393-397.
- 184 Lanuzza, F., Micali, G. and Calabro, G.: On-line HPLC-HRGC coupling and simultaneous transfer of two different LC fractions: determination of aliphatic alcohols and sterols in olive oil. *J. High Resolut. Chromatogr.*, 19 (1996) 444-448.
- 185 Xu, S.: (Determination of the vaporization enthalpy of diethylene glycol dibenzoate by gas chromatography). *Huaxue Tongbao*, No. 5 (1996) 35-38; *C.A.*, 125 (1996) 125007p.
7. PHENOLS
- 186 Bennett, B., Bowler, B.F.J. and Larter, S.R.: Determination of C₆-C₃ alkylphenols in crude oils and water. *Anal. Chem.*, 68 (1996) 3697-3702.
- 187 Ciupe, R., Spangenberg, J., Wild, G. and Meyer, T.: (Gas chromatographic determination of phenols in water samples). *GIT Fachz. Lab.*, 40 (1996) 764-766; *C.A.*, 125 (1996) 256565s.
- 188 Dressman, S.F., Simeone, A.M. and Michael, A.C.: Supercritical fluid chromatography with electrochemical detection of phenols and polyaromatic hydrocarbons. *Anal. Chem.*, 68 (1996) 3121-3127.
- 189 Elbast, W., Guitton, J., Desage, M., Deruaz, D., Manchon, M. and Brazier, J.L.: Comparison between gas chromatography-atomic emission detection and gas chromatography-mass spectrometry for the assay of propofol. *J. Chromatogr. B*, 686 (1996) 97-102.
- 190 Kulkina, K., Getchev, V. and Pavlova, M.: Stereophotometric and gas chromatographic method for separate determination of dioxybenzenes. *Dokl. Bulg. Akad. Nauk.*, 48, No. 11-12 (1995) 43-46; *C.A.*, 125 (1996) 175803r.
- 191 Pissolatto, T.M., Schossler, P., Geller, A.M., Caramao, E.B. and Martins, A.F.: Identification of phenolic compounds in waste water from coal gasification by SPE and GC/MS. *J. High Resolut. Chromatogr.*, 19 (1996) 577-580.
- 192 Puig, D. and Barceló, D.: Determination of phenolic compounds in water and waste water. *TrAC*, 15 (1996) 362-375.
- 193 Reighard, T.S. and Olesik, S.V.: Comparison of supercritical fluids and enhanced-fluidity liquids for the extraction of phenolic pollutants from house dust. *Anal. Chem.*, 68 (1996) 3612-3621.
- 194 Rodríguez, I.; Bollaín, M.H. and Cela, R.: Quantification of two chromatographic unresolved dichlorophenols using gas chromatography-direct deposition-Fourier transform infrared spectrometry and multivariate calibration. *J. Chromatogr. A*, 750 (1996) 341-349.
- 195 Truchon, G., Tardif, R. and Brodeur, J.: Gas chromatographic determination of urinary o-cresol for the monitoring of toluene exposure. *J. Anal. Toxicol.*, 20 (1996) 309-312.
- 196 Turnes, I., Rodríguez, I., García, C.M. and Cela, R.: Determination of chlorophenols in drinking water with high resolution gas chromatography-tandem mass spectrometry. *J. Chromatogr. A*, 743 (1996) 283-292.
8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN
- 8a. Flavonoids
- 197 Stremple, P.: Improved separation and identification of aglycon flavonoids by gas chromatography and phenylmethylsilicone copolymers. *J. High Resolut. Chromatogr.*, 19 (1996) 581-584.
- 8b. Aflatoxins and other mycotoxins
- 198 Mossoba, M.M., Adams, S., Roach, J.A.G. and Trucksess, M.W.: Analysis of trichothecene mycotoxins in contaminated grains by gas chromatography/matrix isolation/Fourier transform infrared spectroscopy and gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1116-1123.
- 199 Selim, M.I., El-Sharkawy, S.H. and Pependorf, W.J.: Supercritical fluid extraction of fumonisin B₁ from grain dust. *J. Agric. Food Chem.*, 44 (1996) 3224-3229.
- 8c. Other compounds with heterocyclic oxygen (incl. tannins)
- 200 Alcock, R.E. and Jones, K.C.: Dioxins in the environment: A review of trend data. *Environ. Sci. Technol.*, 30 (1996) 3133-3143 - a review with 91 refs.
- 201 Barrefors, G., Björkqvist, S., Ramnäs, O. and Petersson, G.: Gas chromatographic separation of volatile furans from birchwood smoke. *J. Chromatogr. A*, 753 (1996) 151-155.
- 202 Kochergina, O.V. and Averburkh, A.I.: (Metrological certification of the quantitative analysis of mass concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin in water samples based on capillary gas-liquid chromatography and high-resolution mass spectrometry). *Ekol. Khim.*, 4 (1995) 102-106; *C.A.*, 125 (1996) 123029y.
- See also 147, 484.
9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES
- 203 Boneva, S. and Vassilev, K.: Gas chromatographic separation of epoxystyrenes on Carbowax 20 M capillary column. *Chromatographia*, 43 (1996) 208-210.
- 204 Bruenner, B.A., Jones, A.D. and German, J.B.: Simultaneous determination of multiple aldehydes in biological tissues and fluids using gas chromatography/stable isotope mass spectrometry. *Anal. Biochem.*, 241 (1996) 212-219.
- 205 Kartsova, L.A., Stolyarov, B.V. and Marinicheur, A.N.: (Determination of formaldehyde in atmospheric air by gas-liquid chromatography). *Ekol. Khim.*, 4 (1995) 117-122; *C.A.*, 125 (1996) 121938v.
- 206 Lange, J. and Eckhoff, S.: Determination of carbonyl compounds in exhaust gas by using a modified DNPH method. *Fresenius J. Anal. Chem.*, 356 (1996) 385-389.

- 207 Luong, J., Sieben, L., Fairhurst, M. and de Zeeuw, J.: Determination of low levels of formaldehyde and acetaldehyde by gas chromatography/flame ionization detection with a nickel catalyst. *J. High Resolut. Chromatogr.*, 19 (1996) 591-594.
- 208 Nawrocki, J., Kalkowska, I. and Dabrowska, A.: Analysis of PPB amounts of aldehydes in water by solid phase extraction. *Pol. J. Environ. Stud.*, 5, No. 3 (1996) 41-44; *C.A.*, 125 (1996) 150526q.
- 209 Stashenko, E.E., Wong, J.W., Martínez, J.R., Mateus, A. and Shibamoto, T.: High-resolution gas chromatography with nitrogen-phosphorous detection of saturated volatile aldehydes derivatized with 2-hydrazinobenzothiazole. *J. Chromatogr. A*, 752 (1996) 209-216.
10. CARBOHYDRATES
- 10a. *Mono and oligosaccharides. Structural studies*
- 210 Klyuchko, A.M. and Melnikova, S.L.: Determination of 1,2,5,6-diisopropylidene-D-glucose and 1,2,5,6-diisopropylidene-3-O-mesyl-D-glucose using gas chromatography. *J. Anal. Chem. (Transl. of Zh. Anal. Khim.)*, 51 (1996) 874-876.
- 211 Veness, R.G. and Evans, C.S.: Identification of disaccharides by gas chromatography-Fourier transform infrared spectroscopy. *J. Chromatogr. A*, 750 (1996) 311-316.
- See also 32, 127.
- 10c. *Glycoproteins and their constituents*
- 212 Caruso, U.: Simple analysis of plasmalogens in erythrocytes using gas chromatography/mass spectrometry with selected-ion monitoring acquisition. *Rapid Commun. Mass Spectrom.*, 10 (1996) 1283-1285.
11. ORGANIC ACIDS AND LIPIDS
- 11a. *Organic acids and simple esters*
- 213 Abdurahman, E.M., Rai, P.P., Shok, M. and Olurinola, P.F.: Analysis of the fatty acid composition of *Irvingia gabonensis* seed fat by gas chromatography and mass spectrometry techniques. *J. Pharm. Res. Dev.*, 1 (1996) 36-38.
- 214 Abdurahman, E.M., Rai, P.P., Shok, M., Olurinola, P.F. and Laakso, I.: Analysis of fatty acid composition of the seed fat of two varieties of *Irvingia gabonensis* by high resolution gas chromatography. *J. Pharm. Res. Dev.*, 1 (1996) 49-51.
- 215 Borch-Jensen, C. and Møllerup, J.: Determination of volatile acid content in the oil of *Euphorbia lagascae* by gas and supercritical fluid chromatography. *J. Am. Oil Chem. Soc.*, 73 (1996) 1161-1164.
- 216 Challinor, J.M.: A rapid simple pyrolysis derivatization gas chromatography-mass spectrometry method for profiling of fatty acids in trace quantities of lipids. *J. Anal. Appl. Pyrolysis*, 37 (1996) 185-197.
- 217 De Swaef, S.J., Kleibohmer, W. and Vlietinck, A.J.: Supercritical fluid chromatography of free fatty acids and ethyl esters in ethanolic extracts of *Sabal serrulata*. *Phytochem. Anal.*, 7 (1996) 223-227.
- 218 Dethlefs, F. and Stan, H.-J.: Determination of resin acids in pulp mill EDT bleaching process effluent. *Fresenius J. Anal. Chem.*, 356 (1996) 403-410.
- 219 Dzhumaev, A.R., Berezkin, V.G., Niyazov, A.N. and Dzhumaeva, L.R.: (Gas chromatographic separation of free aliphatic acids on glass open tubular columns). *J. Anal. Chem. (Transl. of Zh. Anal. Khim.)*, 51 (1996) 981-985.
- 220 Evans, A.M., Li, D.-f., Jones, A., Games, M.P.L., Games, D.E., Gallon, J.R. and Walton, T.J.: Analysis by gas chromatography-mass spectrometry of the fatty acid composition during temperature adaptation in *Aphanizomenon flos-aquae*, a diazotrophic cyanobacterium from the Baltic Sea. *Biochem. Soc. Trans.*, 24 (1996) 475S; *C.A.*, 125 (1996) 242522p.
- 221 Gharaibeh, A.A. and Voorhees, K.J.: Characterization of lipid fatty acids in whole-cell microorganisms using in situ supercritical fluid derivatization/extraction and gas chromatography/mass spectrometry. *Anal. Chem.*, 68 (1996) 2805-2810.
- 222 Jonsson, B.A.G., Lindh, C.H., Gustavsson, C.A., Welinder, H. and Pfaffli, P.: Determination of cyclic organic acid anhydrides in air using gas chromatography. Part 2. Sampling and determination of hexahydrophthalic anhydride, methylhexahydrophthalic anhydride, tetrahydrophthalic anhydride and octenylsuccinic anhydride. *Analyst (Cambridge, U. K.)*, 121 (1996) 1285-1290.
- 223 Jonsson, B.A.G., Welinder, H. and Pfaffli, P.: Determination of cyclic organic acid anhydrides in air using gas chromatography. Part 1. A review. *Analyst (Cambridge, U. K.)*, 121 (1996) 1279-1284.
- 224 Kiseleva, T.L., Frolova, L.N., Baratova, L.A. and Yuskovich, A.K.: (Study of fatty acid composition of dry mumie extracts by GLC). *Khim.-Farm. Zh.*, 30, No. 6 (1996) 62-64; *C.A.*, 125 (1996) 257324z.
- 225 Lehtonen, L., Peltonen, R. and Eerola, E.: Computerized gas-liquid chromatography of bacterial cellular fatty acids in analysis of bacterial mixtures. *J. Microbiol. Methods*, 25 (1996) 317-327; *C.A.*, 125 (1996) 189725d.
- 226 Mossoba, M.M., Yurawecz, M.P., Roach, J.A.G., McDonald, R.E., Flickinger, B.D. and Perkins, E.G.: Analysis of cyclic fatty acid monomer 2-alkenyl-4,4-dimethylloxazoline derivatives by gas chromatography-matrix isolation-Fourier transform infrared spectroscopy. *J. Agric. Food Chem.*, 44 (1996) 3193-3196.
- 227 Reimann, S., Grob, K. and Frank, H.: Environmental chloroacetic acids in foods analyzed by GC-ECD. *Mitt. Geb. Lebensmittelunters. Hyg.*, 87 (1996) 212-222; *C.A.*, 125 (1996) 166052t.
- 228 Snyder, J.M., King, J.W. and Jackson, M.A.: Fat content for nutritional labeling by supercritical fluid extraction and on-line lipase catalyzed reaction. *J. Chromatogr. A*, 750 (1996) 201-207.
- 229 Sorvari, J., Sillanpää, M. and Sihvonen, M.-L.: Development of a gas chromatographic method for the simultaneous determination of trace amounts of ethylenediaminetetraacetic acid and diethylenetriaminepentaacetic acid in natural waters. *Analyst (Cambridge, U. K.)*, 121 (1996) 1335-1339.

- 230 Stankov, I.N., Mikhalkin, A.P. and Sergeeva, A.A.: Gas-chromatographic determination of higher carboxylic acids and some N-acylamino acids in N-acyl derivatives of protein hydrolyzates and surfactants based on these materials. *J. Anal. Chem. (Transl. of Zh. Anal. Khim.)*, 51 (1996) 931-933.
- 231 Sun, L. and Wang, S.: (Quantitative determination of oleic acid in emulsion of *Brucea javanica* oil by GC). *Yaowu Fenxi Zazhi*, 16 (1996) 98-100; *C.A.*, 125 (1996) 177537f.
- 232 Sun, Q., Wei, Y. and Yang, Y.: (Capillary GC-MS for fatty acids analysis in giant Typhonium (*Typhonium giganteum*)). *Zhongcaoyao*, 27 (1996) 333,346; *C.A.*, 125 (1996) 256923g.
- 233 Thompson, R.H.: Simplifying fatty acid analyses in multicomponent foods with a standard set of isothermal GLC conditions coupled with ECL determinations. *J. Chromatogr. Sci.*, 34 (1996) 495-504.
- 234 Ulberth, F. and Henninger, M.: Estimation of the trans fatty acid content of edible oils and fats: An overview of analytical techniques. *Eur. J. Med. Res.*, 1 (1995) 94-99; *C.A.*, 125 (1996) 112982c - a review with 27 refs.
- 235 Xu, H. and Zhou, Q.: (Analysis of fatty acids in *Litsea cubeba* by rapid esterification gas chromatography). *Huaxue Yanjiu Yu Yingyong*, 8 (1996) 120-122; *C.A.*, 125 (1996) 80908q.
- 236 Zehavi, D. and Seiber, J.N.: An analytical method for trifluoroacetic acid in water and air samples using headspace gas chromatographic determination of the methyl ester. *Anal. Chem.*, 68 (1996) 3450-3459.
- 237 Zhang, Q.: (Analysis of fatty acids in squillid meat by capillary gas chromatography). *Sepu*, 14 (1996) 385-387.
- See also 16, 102.
- 11b. *Prostaglandins*
- 238 Hishinuma, T., Yu, G.S.P., Takabatake, M., Nakagawa, Y., Ito, K., Nishikawa, M., Ishibashi, M., Suzuki, K. and Matsumoto, M.: Analysis of the thromboxane/prostacyclin balance in human urine by gas chromatography/selected ion monitoring: abnormalities in diabetics. *Prostaglandins, Leukotrienes Essent. Fatty Acids*, 54 (1996) 445-449.
- 11c. *Lipids and their constituents*
- 239 Artz, W.E.: Supercritical fluid chromatography of trace components in oils and fats. In: King, J.W. and List, G.R. (Editors), *Supercrit. Fluid Technol. Oil Lipid Chem.*, AOCs Press, Champaign, Ill, 1996, pp. 376-386; *C.A.*, 125 (1996) 245857n - a review with 39 refs.
- 240 Sandra, P. and David, F.: Basic principles and the role of supercritical fluid chromatography in lipids analysis. In: King, J.W. and List, G.R. (Editors), *Supercrit. Fluid Technol. Oil Lipid Chem.*, AOCs Press, Champaign, Ill, 1996; *C.A.*, 125 (1996) 215960y - a review with 42 refs.
- 241 Spitzer, V. and Aichholz, R.: Analysis of naturally occurring α -acetotriacylglycerides by gas chromatography-chemical ionization mass spectrometry. *J. High Resolut. Chromatogr.*, 19 (1996) 497-502.
13. STEROIDS
- 13b. *Pregnane and androstane derivatives*
- 242 Baiocchi, C., Giacosa, D., Roggero, M.A. and Marengo, E.: Analysis of steroids by capillary supercritical fluid chromatography with flame-ionization and electron-capture detectors. *J. Chromatogr. Sci.*, 34 (1996) 399-404.
- 243 Danza, G., Dini, S., Bartolucci, G., Lentini, G., Becorpi, A., Massi, G.B., Guarna, A. and Serio, M.: Isotopic dilution GC-MS measurement of 4-hydroxyandrostenedione in postmenopausal breast cancer. *Endocr.-Relat. Cancer*, 3 (1996) 137-143; *C.A.*, 125 (1996) 105395k.
- 244 Orlov, E.N., Antipov, E.M., Berezkin, V.G. and Nikolaev, N.N.: Acid hydrolysis of steroid conjugates combined with solvent extraction for obtaining chromatograms of urine steroid mixtures. *J. Anal. Chem. (Transl. of Zh. Anal. Khim.)*, 51 (1996) 682-686.
- 245 Parks, O.W., Shadwell, R.J., Lightfield, A.R. and Maxwell, R.J.: Determination of melengestrol acetate in supercritical fluid-solid phase extracts of bovine fat tissue by HPLC-UV and GC-MS. *J. Chromatogr. Sci.*, 34 (1996) 353-357.
- 246 Pommier, F., Sioufi, A. and Godbillon, J.: Quantitative determination of norethisterone acetate in human plasma by capillary gas chromatography with mass-selective detection. *J. Chromatogr. A*, 750 (1996) 75-81.
- 247 Ramsey, E.D., Minty, B. and Rees, A.T.: Dynamic aqueous supercritical fluid extraction of the enzymic hydrolysis of testosterone- β -D-glucuronide. Analysis of liberated testosterone by gas chromatography-mass spectrometry. *Anal. Commun.*, 33 (1996) 307-309.
- 13c. *Estrogens*
- 248 Din, N., Bartle, K.D., Clifford, A.A. and Castle, L.: An investigation of supercritical fluid extraction of trenbolone from beef. *J. High Resolut. Chromatogr.*, 19 (1996) 465-469.
- 249 Numazawa, M. and Yoshimura, A.: Synthesis and GC-MS of 6-alkylestradiols, possible aromatase reaction products of 6-alkyl-androstenediones. *Chem. Phar. Bull.*, 44 (1996) 1530-1534; *C.A.*, 125 (1996) 248215n.
- 13d. *Sterols*
- 250 Agullo, E. and Gelos, B.S.: Gas-liquid chromatographic determination of total and free cholesterol in egg pastas. *Food Res. Int.*, 29 (1996) 77-80; *C.A.*, 125 (1996) 165956d.
- 251 Rose-Sallin, C., Sieber, R., Bosset, J.O. and Tabacchi, R.: (Validation of an analytical procedure for the parallel quantification of the cholesterol and its oxides in food). *Mitt. Geb. Lebensmitelunters. Hyg.*, 87 (1996) 137-154; *C.A.*, 125 (1996) 113048q.
- 252 Senorans, F.J., Tabera, J. and Herraiz, M.: Rapid separation of free sterols in edible oils by online coupled reversed phase liquid chromatography-gas chromatography. *J. Agric. Food Chem.*, 44 (1996) 3189-3192.

See also 184.

13g. Other steroids

- 253 De Brabander, H.F., Batjoens, P., Courtheyn, D., Vercammen, J. and de Wasch, K.: Comparison of the possibilities of gas chromatography-mass spectrometry and tandem mass spectrometry systems for the analysis of anabolics in biological material. *J. Chromatogr. A*, 750 (1996) 105-114.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. Terpenes

- 254 Conte, E.D., Conway, S.C., Miller, D.W. and Perschbacher, P.W.: Determination of methylisoborneol in channel catfish pond water by solid phase extraction followed by gas chromatography-mass spectrometry. *Water Res.*, 30 (1996) 2125-2127.
- 255 Hou, L., Lian, X. and Chen, Y.: (The examination of content of elements by gas chromatography). *Sepu*, 14 (1996) 412-413.
- 256 Zenkevich, I.G.: (Analytical parameters of components of essential oils for their GC and GC-MS identification. Mono- and sesquiterpenes). *Rastit. Resur.*, 32, No. 1-2 (1996) 48-58; C.A., 125 (1996) 230152e.

15b. Essential oils

- 257 Castioni, P. and Kapetanidis, I.: Volatile constituents from *Brunfelsia grandiflora*. Qualitative analysis by GC-MS. *Sci. Pharm.*, 64 (1996) 83-91; C.A., 125 (1996) 123396f.
- 258 Chowdhury, S.A., Jahan, K., Tahera Ferdows, B. and Chowdhury, A.K.: GC-MS studies on volatile constituents of *Brugmansia suaveolens* leaves. *Bangladesh J. Sci. Ind. Res.*, 30 (1995) 257-263; C.A., 125 (1996) 110299m.
- 259 Huang, J., Wang, J., Yang, C., Wang, H., Quan, X. and Cao, H.: (GC-MS analysis of essential oil from pericarp of *Illicium modestum* A.C. Smith). *Zhongguo Zhongyao Zazhi*, 21 (1996) 168-170; C.A., 125 (1996) 230155h.
- 260 Mondello, L., Dugo, G., Dugo, P. and Bartle, K.D.: Online HPLC-HRGC in the analytical chemistry of citrus essential oils. *Perfum. Flavor.*, 21, No. 4 (1996) 25-49; C.A., 125 (1996) 150713y.
- 261 Orav, A., Kailas, T. and Liiv, M.: Analysis of terpenoid composition of conifer needle oils by steam distillation/extraction, gas chromatography and gas chromatography-mass spectrometry. *Chromatographia*, 43 (1996) 215-219.
- 262 Stahl-Biskup, E. and Wilhelm, E.: (Essential oils as reflected in European pharmacopeias). *Dtsch. Apoth. Ztg.*, 136, No. 36 (1996) 17-30; C.A., 125 (1996) 230282x.
- 263 Stashenko, E.E., Martínez, R., Pinzón, M.H. and Ramírez, J.: Changes in chemical composition of catalytically hydrogenated orange oil (*Citrus sinensis*). *J. Chromatogr. A*, 752 (1996) 217-222.
- 264 Zitterl-Eglseer, K., Reznicek, G., Chizzola, R., Zitterl, W. and Franz, C.: (Quantitative determination of essential oils in EUCARBON® tablets by means of capillary GC and GC/MS). *Sci. Pharm.*, 64 (1996) 203-209; C.A., 125 (1996) 257326b.

See also 326, 419.

16. NITRO AND NITROSO COMPOUNDS

- 265 Luxenhofer, O., Schneider, M., Dambach, M. and Ballschmiter, K.: Semivolatile long chain C6-C17 alkyl nitrates as trace compounds in air. *Chemosphere*, 33 (1996) 393-404.
- 266 Schlemitz, S. and Pfannhauser, W.: Monitoring of nitropolycyclic aromatic hydrocarbons in food using gas chromatography. *Z. Lebensm. - Unters. Forsch.*, 203 (1996) 61-64.
- 267 Schneider, M. and Ballschmiter, K.: Separation of diastereomeric and enantiomeric alkyl nitrates-systematic approach to chiral discrimination on cyclodextrin LIPODEX-D. *Chem.-Eur. J.*, 2 (1996) 539-544; C.A., 125 (1996) 131252f.
- 268 Warzecha, L.: Separation and analysis of nitroarenes from airborne particulate organic matter by HPLC and capillary GC-MS methods. *J. High Resolut. Chromatogr.*, 19 (1996) 639-642.
- 269 Yinon, J.: Trace analysis of explosives in water by gas chromatography-mass spectrometry with a temperature-programmed injector. *J. Chromatogr. A*, 742 (1996) 205-209.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. Amines and polyamines

- 270 Longo, M. and Cavallaro, A.: Determination of aromatic amines at trace levels by derivatization with heptafluorobutyric anhydride and gas chromatography-electron-capture negative-ion chemical ionization mass spectrometry. *J. Chromatogr. A*, 753 (1996) 91-100.

See also 461.

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

- 271 Fromberg, A., Nilsson, T., Larsen, B.R., Montanarella, L., Facchetti, S. and Madsen, J.O.: Analysis of chloro- and nitroanilines and -benzenes in soil by headspace solid-phase microextraction. *J. Chromatogr. A*, 746 (1996) 71-81.
- 272 Shin, H.-S. and Donike, M.: Stereospecific derivatization of amphetamines, phenol alkylamines, and hydroxyamines and quantification of the enantiomers by capillary GC/MS. *Anal. Chem.*, 68 (1996) 3015-3020.
- 273 Tang, X.: (Gas chromatographic determination of free alkanolamines during amidation of fatliquoring agents). *Pige Huagong*, No. 2 (1996) 36,41-42; C.A., 125 (1996) 198999y.

See also 345.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. Amino acids and their derivatives

- 274 Abe, I. and Nakahara, T.: Enantiomer separation of amino acids as their N-alkyloxycarbonyl alkylamide derivatives by chiral phase capillary GC. *J. High Resolut. Chromatogr.*, 19 (1996) 511-514.

- 275 Imai, K., Fukushima, T., Santa, T., Homma, H., Hamase, K., Sakai, K. and Kato, M.: Analytical chemistry and biochemistry of D-amino acids. *Biomed. Chromatogr.*, 10 (1996) 303-312 - a review with 157 refs.
- 276 Matarese, R.M., Macone, A., Maggio, A. and Cavallini, D.: Aminoethylcysteine ketimine decarboxylated dimer detected in normal human urine by gas-liquid chromatography, selected-ion monitoring and mass spectrometry. *J. Chromatogr. B*, 683 (1996) 269-272.
- 277 Zainal, H.A., LaCroix, D.E. and Wolf, W.R.: Utilization of chromatographic and spectroscopic techniques to study the oxidation kinetics of selenomethionine. *Fresenius J. Anal. Chem.*, 356 (1996) 311-314.

See also 230.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

21a. Purines, pyrimidines, nucleosides, nucleotides

- 278 Zambonin, C.G. and Palmisano, F.: Gas chromatography-mass spectrometry identification of a novel N³-methylated metabolite of 5'-deoxy-5-fluorouridine in plasma of cancer patients undergoing chemotherapy. *J. Pharm. Biomed. Anal.*, 14 (1996) 1521-1528.
- 279 Zambonin, C.G., Guerrieri, A. and Palmisano, F.: Simultaneous determination of 5'-deoxy-5-fluorouridine, 5-fluorouracil and 5,6-dihydro-5-fluorouracil in plasma by gas chromatography-mass spectrometry. *Anal. Chim. Acta*, 329 (1996) 143-152.

See also 50.

21c. Nucleic acids, DNA

- 280 Giese, R.W., Saha, M., Abdel-Baky, S. and Allam, K.: Measuring DNA adducts by gas chromatography-electron capture-mass spectrometry: trace organic analysis. *Methods Enzymol.*, 271 (1996) 504-522; *C.A.*, 125 (1996) 240383v.

21e. Structural studies on DNA and DNA mapping

- 281 Naritsin, D.B. and Markey, S.P.: Assessment of DNA oxidation damage by quantification of thymidine glycol residues using gas chromatography/electron capture negative ionization mass spectrometry. *Anal. Biochem.*, 241 (1996) 35-41.

22. ALKALOIDS

- 282 Casale, J.F. and Moore, J.M.: Lesser alkaloids of cocaine-bearing plants. II. 3-Oxo-substituted tropane esters: detection and mass spectral characterization of minor alkaloids found in South American *Erythroxylum coca* var. *coca*. *J. Chromatogr. A*, 749 (1996) 173-180.
- 283 Chyueh, S.D. and Liu, C.Y.: Ligand exchange gas chromatography on PTFE open tubular columns. *J. Chin. Chem. Soc.*, 43 (1996) 17-20.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23d. Pyridine derivatives

- 284 Bertoni, G., di Palo, V., Tappa, R. and Possanzini, M.: Fast determination of nicotine and 3-ethylenpyridine in indoor environments. *Chromatographia*, 43 (1996) 296-300.
- 285 Karlsson, L., Gyllenhaal, O., Karlsson, A. and Gottfries, J.: Packed-column supercritical fluid chromatography of a new dihydropyridine drug based on direct injection of emulsion samples. *J. Chromatogr. A*, 749 (1996) 193-199.

23e. Other N-heterocyclic compounds

- 286 Bodzek, D., Janoszka, B. and Warzecha, L.: The analysis of PAHs nitrogen derivatives in the sewage sludges of Upper Silesia, Poland. *Water, Air, Soil Pollut.*, 89 (1996) 417-427; *C.A.*, 125 (1996) 94680w.

See also 451.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 287 Andari, M.K., Behbehani, H. and Qabazard, H.: Database for organic sulfur compounds using GC-SCD method. Determination of sulfur containing compounds in straight run gas oils (SRGO). *Fuel Sci. Technol. Int.*, 14 (1996) 897-908; *C.A.*, 125 (1996) 211445m.
- 288 Chen, Y.C. and Lo, J.G.: Gas chromatography with flame ionization and flameless sulfur chemiluminescence detectors in series for dual channel detection of sulfur compounds. *Chromatographia*, 43 (1996) 522-526.
- 289 Feray, S. and Auger, J.: What is the true odour of cut *Allium*? Complementarity of various hyphenated methods: gas chromatography-mass spectrometry and high-performance liquid chromatography-mass spectrometry with particle beam and atmospheric pressure ionization interfaces in sulphenic acids rearrangement components discrimination. *J. Chromatogr. A*, 750 (1996) 63-74.
- 290 Zheivot, V.I., Zarodysheva, M.V. and Zibarev, P.V.: (Determination of sulfur-containing compounds in industrial waste and products of their catalytic purification by gas chromatography). *J. Anal. Chem. (Transl. of Zh. Anal. Khim.)*, 51 (1996) 712-715.

See also 451.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 291 Kan, T., Iwasaki, Y., Yamanobe, H. and Nakamura, H.: (Hygienic chemical studies on household necessities. XXXIII. Determination of tris(2-chloroethyl) phosphate in wall paper and flame retardant household products by gas chromatography). *Tokyo-toritsu Eisei Kenkyusho Kenkyu Nenpo*, 46 (1995) 90-93; *C.A.*, 125 (1996) 144942f.

- 292 Merkel, D. and Appuhn, H.: (Testing of sewage sludges and soils for di(2-ethylhexyl)phthalate (DEHP)). *Korresp. Abwasser*, 43 (1996) 578,580-585; C.A., 125 (1996) 94700c.
- 293 Soderstrom, M.T., Björk, H., Häkkinen, V.M.A., Kostianen, O., Kuitunen, M.-L. and Rautio, M.: Identification of compounds relevant to the chemical weapons convention using selective gas chromatography detectors, gas chromatography-mass spectrometry and gas chromatography-Fourier transform infrared spectroscopy in an international trial proficiency test. *J. Chromatogr. A*, 742 (1996) 191-203.
- 294 Sokolowski, M.W. and Sliwakowski, M.: High resolution gas chromatographic separation and low resolution mass spectra of homologous series of methylphosphonates. *Chem. Anal. (Warsaw)*, 41 (1996) 763-770.
26. ORGANOMETALLIC AND RELATED COMPOUNDS
- 26a. Organometallic compounds
- 295 Becker, G., Colmsjö, A., Janak, K., Nilsson, U. and Östman, C.: Gas chromatographic determination of organometallic compounds with atomic emission detection. *J. Microcolumn Separ.*, 8 (1996) 345-351.
- 296 Behlke, M.K., Uden, P.C., Schantz, M.M. and Wise, S.A.: Development, validation, and application of a method for quantification of methylmercury in biological marine materials using gas chromatography atomic emission detection. *Anal. Chem.*, 68 (1996) 3859-3866.
- 297 Bergmann, K. and Neidhart, B.: Speciation of organolead compounds in water samples by GC-AAS after *in situ* butylation with tetrabutylammonium tetrabutylborate. *Fresenius' J. Anal. Chem.*, 356 (1996) 57-61.
- 298 Carlier-Pinasseau, C., Lespes, G. and Astruc, M.: Determination of butyltin and phenyltin by GC-FPD following ethylation by NaBEt₄. *Appl. Organomet. Chem.*, 10 (1996) 505-512; C.A., 125 (1996) 256545k.
- 299 Liang, L., Horvat, M., Cernichiari, E., Gelein, B. and Balogh, S.: Simple solvent extraction technique for elimination of matrix interferences in the determination of methylmercury in environmental and biological samples by ethylation-gas chromatography-cold vapor atomic fluorescence spectrometry. *Talanta*, 43 (1996) 1883-1888.
- 300 Snell, J.P., Frech, W. and Thomassen, Y.: Performance improvements in the determination of mercury species in natural gas condensate on-line amalgamation trap or solid-phase micro-extraction with capillary gas chromatography-microwave-induced plasma atomic emission spectrometry. *Analyst (Cambridge)*, 121 (1996) 1055-1060.
- 301 Szpunar, J., Ceulemans, M., Schmitt, V.O., Adams, F.C. and Lobinski, R.: Microwave-accelerated speciation analysis for butyltin compounds in sediments and biomaterials by large volume injection capillary gas chromatography quartz furnace atomic absorption spectrometry. *Anal. Chim. Acta*, 332 (1996) 225-232.
- 302 Wang, S. and Wai, C.M.: Supercritical fluid extraction of bioaccumulated mercury from aquatic plants. *Environ. Sci. Technol.*, 30 (1996) 3111-3114.
- 26b. Boranes, silanes and related non-metallic compounds
- 303 Gallus, S.M. and Heumann, K.G.: Development of a gas chromatography inductively coupled plasma isotope dilution mass spectrometry system for accurate determination of volatile element species. Part 1. Selenium speciation. *J. Anal. At. Spectrom.*, 11 (1996) 887-892.
- See also 475.
- 26c. Coordination compounds
- 304 Sinha, M.P.: Analysis of supercritical-extracted chelated metal ions from mixed organic-inorganic samples. U.S. US 5,561,066 (Cl. 436-73; G01N33/20), 1 Oct. 1996, Appl. 433,552, 20 Apr. 1995; 6 pp.; C.A., 125 (1996) 264546b.
- 305 Wu, H., Lin, Y., Smart, N.G. and Wai, C.M.: Separation of lanthanide β -diketonates via organophosphorus adduct formation by supercritical fluid chromatography. *Anal. Chem.*, 68 (1996) 4072-4075.
27. VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- 306 Galuba, G.A. and Gogolewski, M.: The comparison of SFC and HPLC techniques utilized for separation of tocopherols in Tenox GT-2. *Chem. Anal. (Warsaw)*, 41 (1996) 737-741.
- 307 Jham, G.N.: GC quantification of dl-vitamin E acetate in vitamin supplements used in animal feeds. *Pak. J. Sci. Res.*, 47 (1995) 40-42; C.A., 125 (1996) 166405k.
28. ANTIBIOTICS
- 308 Dios-Viéitez, M.C., Goði, M.M., Renedo, M.J. and Fos, D.: Determination of fosfomycin in human urine by capillary gas chromatography: application to clinical pharmacokinetic studies. *Chromatographia*, 43 (1996) 293-295.
29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS
- 29a. General techniques
- 309 Carlier-Pinasseau, C., Astruc, A., Lespes, G. and Astruc, M.: Determination of butyl- and phenyltin compounds in biological material by gas chromatography-flame photometric detection after ethylation with sodium tetraethylborate. *J. Chromatogr. A*, 750 (1996) 317-325.
- 310 Cella-Torrijos, R., Miguéns-Rodríguez, M., Carro-Díaz, A.M. and Lorenzo-Ferreira, R.A.: Optimization of supercritical fluid extraction-gas chromatography of methylmercury in marine samples. *J. Chromatogr. A*, 750 (1996) 191-199.
- 311 Garcia-Repetto, R., Garrido, I. and Repetto, M.: Determination of organochlorine, organophosphorus, and triazine pesticide residues in wine by gas chromatography with electron capture and nitrogen-phosphorus detection. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1423-1427.

- 312 Górecki, T. and Pawliszyn, J.: Determination of tetraethyllead and inorganic lead in water by solid phase microextraction/gas chromatography. *Anal. Chem.*, 68 (1996) 3008-3014.
- 313 Gorecki, T., Mindrup, A. and Pawliszyn, J.: Pesticides by solid-phase microextraction. Result of a round Robin test. *Analyst (Cambridge)*, 121 (1996) 1381-1386.
- 314 Makioka, S., Tera, M. and Kitsuwu, T.: (Analysis of organic pesticides by gas chromatography combined with mass spectrometry). *Shimadzu Hyoron*, 53 (1996) 17-33; *C.A.*, 125 (1996) 188218d.
- 315 Myiata, M., Hirahara, Y., Narita, M., Kimura, M., Watanabe, Y., Ito, S., Takeda, H., Kobayashi, A. and Tonogai, Y.: (Comparison of the simultaneous determination of pesticides residues in foods by GC and GC/MS). *Shokuhin Eiseigaku Zasshi*, 37 (1996) 158-164; *C.A.*, 125 (1996) 140833y.
- 316 Norman, K.N.T.: Electronic pressure control of gas chromatography-mass spectrometry for the confirmation of pesticide residues in cereals and related products. *Chromatographia*, 43 (1996) 177-180.
- 317 Pannier, F., Astruc, A. and Astruc, M.: Determination of butyltin compounds in marine biological samples by enzymic hydrolysis and HG-GC-QFAAS detection. *Anal. Chim. Acta*, 327 (1996) 287-293.
- 318 Parrilla, P. and Martínez Vidal, J.L.: HPLC determination of pesticides in green bean samples after SPE clean-up. *Chromatographia*, 43 (1996) 265-270.
- 319 Quevauviller, P.: Improvement of quality control of speciation analysis using hyphenated techniques. A decade of progress within the European Community. *J. Chromatogr. A*, 750 (1996) 25-33 - a review with 31 refs.
- 320 Shawky, S.: (Tin speciation in selected environmental samples). *Ber. Forschungszent. Juelich*, No. Juel-3254 (1996) 1-125; *C.A.*, 125 (1996) 264620w.
- 321 Stan, H.-J. and Linkerhägner, M.: Pesticide residue analysis in foodstuffs applying capillary gas chromatography with atomic emission detection. State-of-the-art use of modified multimethod S19 of the Deutsche Forschungsgemeinschaft and automated large-volume injection with programmed-temperature vaporization and solvent venting. *J. Chromatogr. A*, 750 (1996) 369-390.
- 29b. *Chlorinated insecticides*
- 322 Báez, M.E., Lastra, O. and Rodríguez, M.: Solid phase extraction of halogenated pesticides from ground and surface waters and their determination by capillary gas chromatography. *J. High Resolut. Chromatogr.*, 19 (1996) 559-563.
- 323 De Boer, J., Wester, P.G., Evers, E.H.G. and Brinkman, U.A.T.: Determination of tris(4-chlorophenyl)methanol and tris(4-chlorophenyl)methane in fish, marine mammals and sediment. *Environ. Pollut.*, 93 (1996) 39-47; *C.A.*, 125 (1996) 229991w.
- 324 Fingerling, G., Hertkorn, N. and Parlar, H.: Formation and spectroscopic investigation of two hexachlorobornanes from six environmentally relevant toxaphene components by reductive dechlorination in soil under anaerobic conditions. *Environ. Sci. Technol.*, 30 (1996) 2984-2992.
- 325 Heberer, T. and Stan, H.-J.: Determination of trace levels of dichlorprop, mecoprop, clofibric acid, and naphthylacetic acid in soil by gas chromatography/mass spectrometry with selected-ion monitoring. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1428-1433.
- 326 Kylin, H., Nordstrand, E., Sjoedin, A. and Jensen, S.: Determination of chlorinated pesticides and PCB in pine needles - improved method for the monitoring of airborne organochlorine pollutants. *Fresenius J. Anal. Chem.*, 356 (1996) 62-69.
- 327 Sannino, A., Mambriani, P., Bandini, M. and Bolzoni, L.: Multi-residue method for the determination of organochlorine insecticides and polychlorinated biphenyl congeners in fatty processed food. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1434-1446.
- 328 Schenck, F.J.: Screening of nonfatty fish for organochlorine pesticide residues by solid-phase extraction cleanup: interlaboratory study. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1215-1219.
- 329 Schenck, F.J., Calderon, L. and Podhorniak, L.V.: Determination of organochlorine pesticide and polychlorinated biphenyl residues in fatty fish by tandem solid-phase extraction cleanup. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1209-1214.
- 330 Schenck, F.J., Calderon, L. and Saudarg, D.E.: Florisil solid-phase extraction cartridges for cleanup of organochlorine pesticide residues in foods. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1454-1458.
- 331 Wallace, J.C., Brzuzy, L.P., Simonich, S.L., Visscher, S.M. and Hites, R.A.: Case study of organochlorine pesticides in the indoor air of a home. *Environ. Sci. Technol.*, 30 (1996) 2715-2718.
- 332 Wang, X., Zhou, S., Sheng, J., Tang, S. and Zhao, T.: (Determination of organic chlorine pesticide residue in Chinese traditional patent medicine by GC). *Zhongguo Yaoke Daxue Xuebao*, 27 (1996) 32-35; *C.A.*, 125 (1996) 96257n.
- See also 425, 441.
- 29c. *Phosphorus insecticides*
- 333 Choudhury, T.K., Gerhardt, K.O. and Mawhinney, T.P.: Solid-phase microextraction of nitrogen- and phosphorus-containing pesticides from water and gas chromatographic analysis. *Environ. Sci. Technol.*, 30 (1996) 3259-3265.
- 334 Dorea, H.S., Tadeo, J.L. and Sanchez-Brunete, C.: Determination of organophosphorus pesticide residues in fruits by gas chromatography with ITD and NPD detection. *Chromatographia*, 43 (1996) 380-386.
- 335 Ngoh, M.A. and Cullison, R.: Determination of trichlorfon and dichlorvos residues in shrimp using gas chromatography with nitrogen-phosphorus detection. *J. Agric. Food Chem.*, 44 (1996) 2193-2196.
- 336 Pardo, A., Gea, F.J., Pardo, J. and Navarro, M.J.: Organophosphorus insecticide residues in the cultivated mushroom, *Agaricus bisporus* (Lange) Imbach. *Mushroom Sci.*, 14 (1995) 515-524; *C.A.*, 125 (1996) 113019f.
- 337 Thompson, T.S. and Trebe, R.G.: Solid phase extraction and GC-MS techniques for the confirmation of chlorpyrifos contamination of surface water supplies. *Bull. Environ. Contam. Toxicol.*, 57 (1996) 525-531; *C.A.*, 125 (1996) 176800z.

- 338 Vreuls, J.J., Swen, R.J.J., Goudriaan, V.P., Kerkhoff, M.A.T., Jongenotter, G.A. and Brinkman, U.A.T.: Automated on-line gel permeation chromatography-gas chromatography for the determination of organophosphorus pesticides in olive oil. *J. Chromatogr. A*, 750 (1996) 275-286.
- 29d. *Carbamates*
- 339 Ahmad, N., Guo, L., Mandarakas, P., Farah, V., Appleby, S. and Gibson, T.: Headspace gas-liquid chromatographic determination of dithiocarbamate residues in fruits and vegetables with confirmation by conversion to ethylenethiourea. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1417-1422.
- 340 Slobodnik, J., Hoekstra-Oussoren, S.J.F., Lager, M.E., Honing, M., van Baar, B.L.M. and Brinkman, U.A.T.: Online solid-phase extraction-liquid chromatography-particle beam mass spectrometry and gas chromatography-mass spectrometry of carbamate pesticides. *Analyst (Cambridge)*, 121 (1996) 1327-1334.
- 341 Yarita, T., Nomura, A., Horimoto, Y. and Gonda, S.: On-line coupled supercritical fluid extraction and chromatography for the determination of thiocarbamate herbicides in soil matrix. *J. Chromatogr. A*, 750 (1996) 175-181.
- 29e. *Herbicides*
- 342 Anastassiades, M. and Scherbaum, E.: (Determination of phenoxy alkanic acid herbicides as their 2,2,2-trichloroethyl (TCE) esters in plant extracts). *Dtsch. Lebensm.-Rundsch.*, 92 (1996) 175-188; *C.A.*, 125 (1996) 193783p.
- 343 Bicchi, C., Balbo, C., D'Amato, A. and Panero, O.: SFC-UV determination of diflufenuron residues, teflubenzuron and triflufuron in apple and pear pulps for baby food. *Chromatographia*, 43 (1996) 439-443.
- 344 Bondarev, V.S., Spiridonov, Y.Y., Shestakov, V.G., Karlova, L.V. and Bondareva, T.A.: (Gas chromatographic method for finding bentazon in herbicidal formulations, water, soil, and plants). *Agrokhimiya*, No. 3 (1996) 107-114; *C.A.*, 125 (1996) 107656v.
- 345 Hu, R., Berthion, J.-M., Bodereau, I. and Fournier, J.: Simultaneous capillary GC-MS determination of triazines and amides in water. *Chromatographia*, 43 (1996) 181-186.
- 346 Jones, F.W.: Multiresidue analysis of pesticides in wool wax and lanolin using gel permeation and gas chromatography. *J. Agric. Food Chem.*, 44 (1996) 3197-3201.
- 347 Kakalikova, L., Matisova, E. and Lesko, J.: Analysis of metalaxyl residues in wines by SPE in combination with HRCGC and GC/MS. *Z. Lebensm.-Unters. Forsch.*, 203 (1996) 56-60; *C.A.*, 125 (1996) 193787t.
- 348 Kühn, K.-H., Leng, G., Bucholski, K.A., Dunemann, L. and Idel, H.: Determination of pyrethroid metabolites in human urine by capillary gas chromatography-mass spectrometry. *Chromatographia*, 43 (1996) 285-292.
- 349 Lafrance, P., Banton, O., Sabik, H., Cooper, S., Brousseau, P. and Fournier, M.: (Comparison between an enzyme-linked immunosorbent assay and a gas chromatographic procedure for the determination of atrazine in runoff water). *Analisis*, 24 (1996) 133-138; *C.A.*, 125 (1996) 123038a.
- 350 Lancas, F.M., Rissato, S.R. and Mozeto, A.A.: Off-line SFE-CGC-ECD analysis of 2,4-D and dicamba residues in real sugar cane, rice and corn samples. *J. High Resolut. Chromatogr.*, 19 (1996) 564-568.
- 351 Leng, G., Kuehn, K.H., Dunemann, L. and Idel, H.: (Gas chromatographic and mass spectrometric method for the determination of selected pyrethroid metabolites in urine). *Zentralbl. Hyg. Umweltmed.*, 198 (1996) 443-451; *C.A.*, 125 (1996) 107219e.
- 352 Lentza-Rizos, C.: Determination of triazine residues in water.: comparison between a gas chromatographic method and an enzyme-linked immunosorbent assay (ELISA). *Bull. Environ. Contam. Toxicol.*, 57 (1996) 413-420; *C.A.*, 125 (1996) 123015r.
- 353 Modeste, F. and Caude, M.: On-line coupling of liquid chromatography and capillary gas chromatography for the determination of a trace pyrethroid insecticide in fruit extracts. *J. High Resolut. Chromatogr.*, 19 (1996) 535-542.
- 354 Molins, C., Hogendoorn, E.A., Heusinkveld, H.A.G., van Harten, D.C., van Zoonen, P. and Baumann, R.A.: Microwave assisted solvent extraction (MASE) for the efficient determination of triazines in soil samples with aged residues. *Chromatographia*, 43 (1996) 527-532.
- 355 Shackelford, D.D., Duebelbeis, D.O. and Snell, B.E.: Determination of residues of cloransulamethyl in soybeans and soybean forage, hay, and processed commodities by capillary gas chromatography with mass spectrometric detection. *J. Agric. Food Chem.*, 44 (1996) 3570-3575.
- 356 Stout, S.J., DaCunha, A.R., Fletcher, J.S. and Picard, G.L.: Rapid determination of imazapyr in corn by gas chromatography/mass spectrometry with electron capture negative ion chemical ionization. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1220-1225.
- 357 Tsumura, Y., Goto, Y., Munakata, N., Nakamura, Y., Tonogai, Y. and Shibata, T.: (Determination of fenarimol and lenacil in agricultural products by GC). *Shokuhih Eiseigaku Zasshi*, 37 (1996) 119-122; *C.A.*, 125 (1996) 84953y.
- See also 333.
- 29f. *Fungicides*
- 358 Tsumura, Y., Nakamura, Y., Tonogai, Y. and Shibata, T.: Potential interference by free fatty acids in determination of tricyclazole in brown rice by gas chromatography with flame thermoionic detection. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1471-1476.
- 29g. *Other types of pesticides and various agrochemicals*
- 359 Vilchez, J.L., El-Khattabi, R., Fernández, J., González-Casado, A. and Navalón, A.: Determination of imidacloprid in water and soil samples by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 746 (1996) 289-294.

31. PLASTICS AND THEIR INTERMEDIATES

- 360 Andrzejewska, E., Voelkel, A., Andrzejewski, M. and Maga, R.: Examination of surfaces of solid polymers by inverse gas chromatography: 2. Acid-base properties. *Polymer*, 37 (1996) 4333-4344.
- 361 Berezkin, V.G.: (A study of phase transition in polymers by inverse gas chromatography). *Zh. Fiz. Khim.*, 70 (1996) 775-782.
- 362 González-Vila, F.J., Del Rio, J.C., Martin, F. and Verdejo, T.: Pyrolytic alkylation-gas chromatography-mass spectrometry of model polymers. Further insights into the mechanism and scope of the technique. *J. Chromatogr. A*, 750 (1996) 155-160.
- 363 Li, B.: Studies of polymer properties via inverse gas chromatography. *Rubber Chem. Technol.*, 69 (1996) 347-376; *C.A.*, 125 (1996) 250093q - a review with 28 refs.
- 364 Nishino, R. and Saito, T.: (Determination of phenolic resin concentration in particulate matter accumulated on roads by hydrothermal decomposition-GC). *Bunseki Kagaku*, 45 (1996) 915-920.
- 365 Wang, F.C.-Y.: Determination of polyacrylamide in polyvinyl alcohol by pyrolysis-gas chromatography with atomic emission detection. *J. Chromatogr. A*, 753 (1996) 101-108.
- 366 Wang, F.C.-Y. and Smith, P.B.: Quantitative analysis and structure determination of styrene/methyl methacrylate copolymers by pyrolysis gas chromatography. *Anal. Chem.*, 68 (1996) 3033-3037.

See also 463, 478.

32. DRUG ANALYSIS

32a. Drug analysis, general techniques

- 367 Bojarski, J. and Aboul-Enein, H.Y.: Recent applications of chromatographic resolution of enantiomers in pharmaceutical analysis. *Biomed. Chromatogr.*, 10 (1996) 297-302 - a review with 176 refs.
- 368 James, C.A., Burton, N.K., Enos, T.A., Simmonds, R.J., Wood, S.A., Rees, S.A., Padbury, G. and Schwende, F.J.: Bioanalytical strategies to support the development of an HIV protease inhibitor, including GC-MS, HPLC and chiral analysis. *Methodol. Surv. Bioanal. Drugs*, 24 (1996) 82-88; *C.A.*, 125 (1996) 204694p.
- 369 Pedersen-Bjergaard, S. and Greibrokk, T.: Environmental applications of capillary gas chromatography coupled with atomic emission detection - a review. *J. High Resolut. Chromatogr.*, 19 (1996) 597-607 - a review with 170 refs.
- 370 Qin, Z.-l.: Advances in biopharmaceutical analysis in the People's Republic of China: 1993-1995. *J. Pharm. Biomed. Anal.*, 14 (1996) 1395-1403.
- 371 Salvador, A., Jaime, M.A., Becerra, G. and de la Guardia, M.: Supercritical fluid chromatography in drug analysis: a literature survey. *Fresenius J. Anal. Chem.*, 356 (1996) 109-122 - a review with 90 refs.

- 372 Sodhi, R.A., Chawla, J.L. and Sane, R.T.: Simultaneous determination of paracetamol, ibuprofen and chlorzoxazone by HPLC, HPTLC and GC methods. *Indian Drugs*, 33 (1996) 280-285; *C.A.*, 125 (1996) 257351f.
- 373 Williams, R.C., Alasandro, M.S., Fasone, V.L., Boucher, R.J. and Edwards, J.F.: Comparison of liquid chromatography, capillary electrophoresis and supercritical fluid chromatography in the determination of Losartan Potassium drug substance in Cozaar tablets. *J. Pharm. Biomed. Anal.*, 14 (1996) 1539-1546; *C.A.*, 125 (1996) 204681g.
- 374 Yasuda, N., Oka, Y., Otsuki, K., Tsuchihashi, H., Katagi, M. and Nishikawa, M.: (Study of components in crude drugs by head-space gas chromatography. II. Components of Atractylodes). *Yakugaku Zasshi*, 116 (1996) 728-734; *C.A.*, 125 (1996) 230933k.

See also 75, 189.

32b. Antirheumatics and antiinflammatory drugs

- 375 Begerow, J., Jermann, E., Keles, T., Koch, T. and Dunemann, L.: Screening method for the determination of 28 volatile organic compounds in indoor and outdoor air at environmental concentrations using dual-column capillary gas chromatography with tandem electron-capture-flame ionization detection. *J. Chromatogr. A*, 749 (1996) 181-191.
- 376 Blum, W., Faigle, J.W., Pfaar, U. and Sallmann, A.: Characterization of a novel diclofenac metabolite in human urine by capillary gas chromatography-negative chemical ionization mass spectrometry. *J. Chromatogr. B*, 685 (1996) 251-263.
- 377 Borenstein, M.R., Xue, Y., Cooper, S. and Tzeng, T.-B.: Sensitive capillary gas chromatographic-mass spectrometric selected-ion monitoring method for the determination of diclofenac concentrations in human plasma. *J. Chromatogr. B*, 685 (1996) 59-66.

32c. Autonomic and cardiovascular drugs

- 378 Batjoens, P., Courtheyn, D., de Brabander, H.F., Vercammen, J., de Wasch, K. and Logghe, M.: Gas chromatographic-tandem mass spectrometric analysis of clenbuterol residues in faeces. *J. Chromatogr. A*, 750 (1996) 133-139.
- 379 Black, S.B., Stenhouse, A.M. and Hansson, R.C.: Solid-phase extraction and derivatisation methods for β -blockers in human *post mortem* whole blood, urine and equine urine. *J. Chromatogr. B*, 685 (1996) 67-80.
- 380 Couper, F.J. and Drummer, O.H.: Gas chromatographic-mass spectrometric determination of β_2 -antagonist in *post mortem* blood: application in forensic medicine. *J. Chromatogr. B*, 685 (1996) 265-272.
- 381 Ding, L. and Qian, W.: (GC determination of buflomedil hydrochloride and its tablets). *Zhongguo Yiyao Gongye Zazhi*, 27 (1996) 119-121; *C.A.*, 125 (1996) 123927q.
- 382 Gabiola, C., García-Calonge, M.A., Portillo, M.P., Martínez, J.A. and del Barrio, A.S.: Validation of a method for the determination of salbutamol in animal urine by gas chromatography-mass spectrometry and its application to treated lamb samples. *J. Microcolumn Separ.*, 8 (1996) 361-364.

- 383 Hyötyläinen, T., Piiviö, R. and Riekkola, M.-L.: Screening of four beta-blockers and codeine in urine by on-line coupled RPLC-GC with on-line derivatization. *J. High Resolut. Chromatogr.*, 19 (1996) 439-443.
- 384 Kovacs, K., Eroes-Takacs, T. and Hegedues-Vajda, A.: Determination of the impurity profile of R₁/CH-13584 by on line gas chromatography/mass spectrometry method. *Rapid Commun. Mass Spectrom.*, 10 (1996) 1536-1538.
- 385 Lin, S.J., Wu, H.L., Chen, S.H. and Wen, Y.H.: Derivatization-gas chromatographic determination of perindopril. *Anal. Lett.*, 29 (1996) 1751-1762.
- 386 Ramjit, H.G., Singh, M.M. and Coddington, A.B.: Gas chromatographic/mass spectrometric analysis of methyl methanesulfonate and ethyl methanesulfonate in the bismesylate salt of DPI 201-106, a positive inotropic agent for the treatment of heart failure. *J. Mass Spectrom.*, 31 (1996) 867-872.
- 387 Ulrich, S., Isensee, T. and Pester, U.: Simultaneous determination of amitriptyline, nortriptyline and four hydroxylated metabolites in serum by capillary gas-liquid chromatography with nitrogen-phosphorus-selective detection. *J. Chromatogr. B*, 685 (1996) 81-89.
- 388 Van Vyncht, G., Preece, S., Gaspar, P., Maghuin-Rogister, G. and DePauw, E.: Gas and liquid chromatography coupled to tandem mass spectrometry for the multiresidue analysis of β -agonists in biological matrices. *J. Chromatogr. A*, 750 (1996) 43-49.
- 389 Hold, K.M., Crouch, D.J., Rollins, D.E., Wilkins, D.G., Canfield, D.V. and Maes, R.A.: Determination of alprazolam and α -hydroxyalprazolam in human plasma by gas chromatography/negative-ion chemical ionization mass spectrometry. *J. Mass Spectrom.*, 31 (1996) 1033-1038.
- 397 Ishii, A., Seno, H., Kumazawa, T., Watanabe, K., Hattori, H. and Suzuki, O.: Simple extraction of phencyclidine from human body fluids by headspace solid-phase microextraction (SPME). *Chromatographia*, 43 (1996) 331-333.
- 398 Lin, D.-L., Shaw, K.-P. and Chen, C.-Y.: Determination of codeine, morphine and 6-acetylmorphine in urine. *Yaowu Shipin Fenxi*, 4 (1996) 25-34; *C.A.*, 125 (1996) 184747c.
- 399 Marinkovic, V.D., Gudzic, B., Milojkovic, S.S., Nedeljkovic, J.M. and Comor, J.J.: Gas chromatography-mass spectrometry study of isosorbide 5-mononitrate stability. *J. Chromatogr. A*, 746 (1996) 286-288.
- 400 Terada, M., Islam, M.N., Tun, Z., Honda, K., Wakasugi, C., Shinozuka, T., Yanagida, J.-i., Yamamoto, T. and Kuroiwa, Y.: Determination of ester-type local anesthetic drugs (procaine, tetracaine, and T-caine) in human serum by wide-bore capillary gas chromatography with nitrogen-phosphorus detection. *J. Anal. Toxicol.*, 20 (1996) 318-332.
- 401 Uyanik, A. and Marr, I.L.: Gas chromatographic separation of anesthetic gases on a single column. *Chromatographia*, 43 (1996) 205-207.
- See also 417.
- 32d. *Central nervous system drugs*
- 389 Alburges, M.E., Huang, W., Foltz, R.L. and Moody, D.E.: Determination of methadone and its N-demethylation metabolites in biological specimens by GC-PICI-MS. *J. Anal. Toxicol.*, 20 (1996) 362-368.
- 390 Browne, D., Tennant, K. and Shepherd, M.: A comparison of hot and temperature-programmed GC injection in relation to pseudoephedrine. *Methodol. Surv. Bioanal. Drugs*, 24 (1996) 254-256; *C.A.*, 125 (1996) 237412y.
- 391 Cai, K., Tan, B., Li, Z., Chen, H., Huang, M., Zhao, X. and Jiang, W.: (Pharmacokinetic studies of controlled release tablets of morphine by GC-MS). *Yaowu Fenxi Zazhi*, 16, No. 2 (1996) 89-92; *C.A.*, 125 (1996) 157651k.
- 392 Chawla, J.L., Sodhi, R.A. and Sane, R.T.: Simultaneous determination of chlorzoxazone, paracetamol and diclofenac sodium by different chromatographic techniques. *Indian Drugs*, 33 (1996) 171-178; *C.A.*, 125 (1996) 204674g.
- 393 Dallakian, P., Budzikiewicz, H. and Brzezinka, H.: Detection and quantitation of amphetamine and methamphetamine: electron impact and chemical ionization with ammonia-comparative investigation on Shimadzu QP 5000 GC-MS system. *J. Anal. Toxicol.*, 20 (1996) 255-261.
- 394 Faser, A.D. and Meatherall, R.: Comparative evaluation of five immunoassays for the analysis of alprazolam and triazolam metabolites in urine: effect of lowering the screening and GC-MS cut-off values. *J. Anal. Toxicol.*, 20 (1996) 217-223.
- 395 Fay, J., Fogerson, R., Schoendorfer, D., Niedbala, R.S. and Spiehler, V.: Determination of methamphetamine in sweat by EIA and GC-MS. *J. Anal. Toxicol.*, 20 (1996) 398-403.
- 32e. *Chemotherapeutics (exc. cytostatics and antibiotics)*
- 402 Ashraf-Khorassani, M., Taylor, L.T. and Schweighardt, F.K.: Comparison of supercritical CHF₃ and CO₂ and methanol-modified CHF₃ and CO₂ for extraction of sulfonamides from chicken liver. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1043-1049.
- 403 Cannavan, A., Hewitt, S.A., Blanchflower, W.J. and Kennedy, G.: Gas chromatographic-mass spectrometric determination of sulfomethazine in animal tissues using methyl/trimethylsilyl derivatives. *Analyst (Cambridge)*, 121 (1996) 1457-1461.
- 404 Loussouarn, S., Blanc, G. and Pinault, L.: Determining of levamisole in European eel plasma by gas chromatography using liquid and solid-phase extraction. *Quim. Anal. (Barcelona)*, 14 (1995) 223-227.
- 32g. *Other drug categories*
- 405 Batjoens, P., de Brabander, H.F. and de Wasch, K.: Rapid and high-performance analysis of thyreostatic drug residues in urine using gas chromatography-mass spectrometry. *J. Chromatogr. A*, 750 (1996) 127-132.
- 406 Kim, H., Scott, M.C., Wilkinson, J.M., Creegan, J.A. and Lin, C.: Gas chromatographic (GC) method for the determination of SCH 44643, an orally active antagonist of platelet activating factor in rat plasma. *Chromatographia*, 43 (1996) 533-536.
- 407 Li, D., Zhou, J. and Zhan, Y.: (Analysis of xiangquan liquor by gas chromatography). *Sepu*, 14 (1996) 414.
- 408 Spangler, M.D. and Sidhom, M.B.: Quantitation of the organic solvent extractables (OSE) of petrolatum and analysis by capillary gas chromatography. *J. Pharm. Biomed. Anal.*, 15 (1996) 139-143; *C.A.*, 125 (1996) 257362k.

See also 285.

32h. Toxicological and forensic applications

- 409 Ameno, K., Fuke, C., Ameno, S., Kinoshita, H. and Ijiri, I.: Application of a solid-phase microextraction technique for the detection of urinary methamphetamine and amphetamine by gas chromatography. *J.-Can. Soc. Forensic Sci.*, 29 (1996) 43-48.
- 410 Brooks, K.E. and Smith, N.B.: Lack of hydrocodone and hydro-morphine interference in the GC-MS detection of morphine and codeine. *J. Anal. Toxicol.*, 20 (1996) 269-270.
- 411 De Brabander, H.F., Batjoens, P., Courtheyn, D. and de Wasch, K.: Using GC-MS to identify residues of illegal growth promoters. *LC-GC Int.*, 9 (1996) 534-538.
- 412 Ensslin, H.K., Kovar, K.-A. and Maurer, H.H.: Toxicological detection of the designer drug 3,4-methylenedioxyethylamphetamine (MDE, "Eve") and its metabolites in urine by gas chromatography-mass spectrometry and fluorescence polarization immunoassay. *J. Chromatogr. B*, 683 (1996) 189-197.
- 413 Fiers, T., Maes, V. and Sevens, C.: Automation of toxicological screenings on a Hewlett Packard Chemstation GC-MS system. *Clin. Biochem.*, 29 (1996) 357-361; *C.A.*, 125 (1996) 187727g.
- 414 Kronstrand, R., Hatanpaeae, M. and Jonsson, J.A.: Determination of phenmetrazine in urine by gas chromatography-mass spectrometry. *J. Anal. Toxicol.*, 20 (1996) 277-280.
- 415 Phillips, D.L., Tebbett, I.R. and Bertholf, R.L.: Comparison of HPLC and GC-MS for measurement of cocaine and metabolites in human urine. *J. Anal. Toxicol.*, 20 (1996) 305-308.
- 416 Smirnow, D. and Logan, B.K.: Analysis of ecgonine and other cocaine biotransformation products in *post mortem* whole blood by protein precipitation-extractive alkylation and GC-MS. *J. Anal. Toxicol.*, 20 (1996) 463-467.
- 417 Wang, P.-Y., Tai, S.-J., Huang, B.-C., Liu, R.H. and Suen, E.R.-T.: (GC/MS analysis of amphetamine in urine with amphetamine-d₅ (side chain) as an internal standard). *Yaowu Shipin Fenxi*, 4 (1996) 123-130; *C.A.*, 125 (1996) 211670f.
- 418 Wolf, C.E., Saady, J.J. and Poklis, A.: Determination of gabapentin in serum using solid-phase extraction and gas-liquid chromatography. *J. Anal. Toxicol.*, 20 (1996) 498-501.

See also 178, 183, 253, 380.

32i. Plant extracts

- 419 Czerwinski, J., Zygmunt, B. and Namiesnik, J.: Head-space solid phase microextraction for the GC-MS analysis of terpenoids in herb-based formulations. *Fresenius J. Anal. Chem.*, 356 (1996) 80-83.
- 420 Stashenko, E.E., Puertas, M.A. and Combariza, M.Y.: Volatile secondary metabolites from *Spilanthes americana* obtained by simultaneous steam distillation-solvent extraction and supercritical fluid extraction. *J. Chromatogr. A*, 752 (1996) 223-232.

See also 232.

33. CLINICO-CHEMICAL APPLICATIONS

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

- 421 Chepurnoi, I.P. and Bolbat, K.E.: (Development of a method for gas chromatographic measurement of sugars and organic acids in the urine of diabetics). *Klin. Lab. Diagn.*, No. 3 (1996) 48-50; *C.A.*, 125 (1996) 242062p.
- 422 McCarty, G.W. and Blicher-Mathiesen, G.: Automated chromatographic analysis of atmospheric gases in environmental samples. *Soil Sci. Soc. Am. J.*, 60 (1996) 1439-1442; *C.A.*, 125 (1996) 255490b.
- 423 Murata, H., Nagayanagi, Y., Matsumoto, M., Inoue, Y., Shinka, T., Kuhara, T. and Matsumoto, I.: (Chemical diagnosis by gas chromatography/mass spectrometry. Application to neonatal mass screening for congenital metabolic disorders). *Shimadzu Hyoron*, 53 (1996) 35-41; *C.A.*, 125 (1996) 162407q - a review with 7 refs.

See also 139, 204, 278, 383.

34. FOOD ANALYSIS

34a. General papers and reviews

- 424 Careri, M. and Mangia, A.: Multidimensional detection methods for separations and their application in food analysis. *TRAC*, 15 (1996) 538-550.

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

- 425 Prachar, V., Uhnak, J., Veningerova, M. and Szokolay, A.: Organochlorine xenobiotics in the food chain in the Slovakia. *Fresenius Environ. Bull.*, 5 (1996) 95-101.

See also 138, 140, 150, 184, 198, 227, 228, 234, 237, 245, 251, 252, 311, 315, 327, 328, 329, 334, 335, 336, 338, 339, 343, 347, 350, 353, 358, 462.

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

- 426 Bartschat, D., Maas, B., Smietana, S. and Mosandl, A.: Stereoisomeric flavor compounds. LXXIII: 3-butylphthalide: chiro-specific analysis, structure and properties of the enantiomers. *Phytochem. Anal.*, 7 (1996) 131-135; *C.A.*, 125 (1996) 84901e.
- 427 Gonzalez-Vinas, M.A., Perez-Coello, M.S., Salvador, M.D., Cabezudo, M.D. and Martin-Alvarez, P.J.: Changes in gas-chromatographic volatiles of young Airen wines during bottle storage. *Food Chem.*, 56 (1996) 399-403.
- 428 Leunissen, M., Davidson, V.J. and Kakuda, Y.: Analysis of volatile flavor components in roasted peanuts using supercritical fluid extraction and gas chromatography-mass spectrometry. *J. Agric. Food Chem.*, 44 (1996) 2201-2206.

- 429 Misharina, T.A. and Golovnya, R.A.: (Study of the composition of volatiles in raw and processed sardines by gas chromatography and gas chromatography-mass spectrometry). *J. Anal. Chem. (Transl. of Zh. Anal. Khim.)*, 51 (1996) 730-734.
- 430 Morales, A.L., Albarracín, D., Rodríguez, J., Duque, C., Riaño, L.E. and Espitia, J.: Volatile constituents from Andes berry (*Rubus glaucus* Benth). *J. High Resolut. Chromatogr.*, 19 (1996) 585-587.
- 431 Mosandl, A.: (Genuineness evaluation of fruit aromas by means of enantio-selective gas chromatography). *Fluess. Obst*, 63 (1996) 386-388,390; *C.A.*, 125 (1996) 165856w - a review with 27 refs.
- 432 Reineccius, G.A.: Instrumental means of monitoring the flavor quality of foods. *ACS Symp. Ser.*, 631 (1996) 241-252; *C.A.*, 125 (1996) 165870w - a review with 32 refs.
- 433 Remberg, B., Nikiforov, A. and Buchbauer, G.: Kovats' indices of pyrazines and related flavor substances on methyl silicone and Carbowax 20M phases. *Sci. Pharm.*, 64 (1996) 51-56; *C.A.*, 125 (1996) 113000t.
- 434 Salmon, B., Remaud, G., Fourel, F. and Martin, G.J.: (Application of ¹³C GC-IRMS analysis to banana flavor). *Riv. Ital. EPPOS*, 7 (1996) 490-501; *C.A.*, 125 (1996) 113138u.
- 435 Schmidt, N.E., Santiago, L.M., Eason, H.D., Dafford, K.A., Grooms, C.A., Link, T.E., Manning, D.T., Cooper, S.D. and Keith, R.C.: Rapid extraction method of quantitating the lachrymatory factor of onion using gas chromatography. *J. Agric. Food Chem.*, 44 (1996) 2197-2200.
- 436 Snyder, J.M., King, J.W. and Nam, K.-S.: Determination of volatile and semivolatile contaminants in meat by supercritical fluid extraction/gas chromatography/mass spectrometry. *J. Sci. Food Agric.*, 72 (1996) 25-30.
- 437 Tuomala, T. and Kallio, H.: Identification of free fatty acids and some other volatile flavor compounds from Swiss cheese using online supercritical fluid extraction - gas chromatography. *Z. Lebensm. - Unters. Forsch.*, 203 (1996) 236-240.
- 438 Van Ruth, S.M., Roozen, J.P. and Cozijnsen, J.L.: Gas chromatography/sniffing port analysis evaluated for aroma release from rehydrated French beans (*Phaseolus vulgaris*). *Food Chem.*, 56 (1996) 343-346.
- 439 Wadodkar, U.R., Murthi, T.N. and Punjra, J.S.: Isolation of ghee volatiles by vacuum degassing, their separation and identification using gas chromatography/mass spectrometry. *Indian J. Dairy Sci.*, 49 (1996) 185-198.
- See also 254, 289.
35. ENVIRONMENTAL ANALYSIS
- 35a. General papers and reviews
- 440 Clement, R.E. and Koester, C.J.: Quality control and quality assurance aspects of gas chromatography-mass spectrometry for environmental analysis. In: Subramanian, G. (Editors), *Qual. Assur. Environ. Monit.: Instrum. Methods*, VCH, Weinheim, 1995, pp. 193-211; *C.A.*, 125 (1996) 157042n - a review with 18 refs.
- 441 Lopez-Avila, V. and Benedicto, J.: Microwave assisted extraction combined with gas chromatography and enzyme-linked immunosorbent assay. *TrAC*, 15 (1996) 334-341.
- 442 Merten, H., Richter, H. and Landrock, A.: (New GC/MS screening methods for environmental analysis). *CLB, Chem. Labor Biotech.*, 47 (1996) 170-175; *C.A.*, 125 (1996) 184481m.
- 443 Rosecrance, A. and Kibler, LaDonna.: Environmental methods quantitation and QC limits. Part II-Organics by GC and GC/MS. *Environ. Test. Anal.*, 5, No. 5 (1996) 16,18-20; *C.A.*, 125 (1996) 184433x.
- 444 Woolfenden, E.A.: Practical aspects of monitoring volatile organics in air. In: Subramanian, G. (Editors), *Qual. Assur. Environ. Monit.: Instrum. Methods*, VCH, Weinheim, 1995, pp. 133-191; *C.A.*, 125 (1996) 149523e - a review with 56 refs.
- 445 Yang, M.J. and Pawliszyn, J.: Multiplex gas chromatography: a practical approach for environmental monitoring. *TrAC*, 15 (1996) 273-278.
- See also 200, 223, 319.
- 35b. Air pollution (complex mixtures; single compounds by cross-reference only)
- 446 Aflalaye, A., Anguel, S., Sternberg, R., Raulin, F. and Vidal-Madjar, C.: Gas chromatography of titan's atmosphere. VII. Analysis of low molecular weight hydrocarbons and nitriles with cyanopropylphenyl dimethyl polysiloxane capillary columns. *J. Chromatogr. A*, 746 (1996) 63-69.
- 447 Bartulewicz, J., Bartulewicz, E., Gawłowski, J. and Niedzielski, J.: Gas chromatographic determination of α -phthalic acid esters in source emission. *Chem. Anal. (Warsaw)*, 41 (1996) 753-762.
- 448 Bartulewicz, J., Bartulewicz, E., Gawłowski, J. and Niedzielski, J.: Sampling of alcohols, ethers, esters and ketones in emissions for gas chromatographic determination. *Chem. Anal. (Warsaw)*, 41 (1996) 541-550.
- See also 142, 147, 149, 155, 165, 166, 171, 179, 181, 205, 206, 222, 223, 236, 284, 331.
- 35c. Water pollution (complex mixtures; single compounds by cross-reference only)
- 449 Golovko, I.V., Revelskii, I.A., Yashin, Y.S., Zirko, B.I. and Efimov, I.P.: (Gas-chromatographic method for the determination of trace low-volatile organic compounds in water, based on solid-phase extraction and thermal desorption). *Vestn. Mosk. Univ., Ser. 2: Khim.*, 37, No. 2 (1996) 137-143; *C.A.*, 125 (1996) 256561n.
- 450 Hankemeier, T., Stekete, P.C., Vreuls, J.J. and Brinkman, U.A.T.: Automated at-line solid-phase extraction-gas chromatography analysis of micropollutants in water using the PrepStation. *J. Chromatogr. A*, 750 (1996) 161-174.
- 451 Johansen, S.S. and Pawliszyn, J.: Trace analysis of hetero aromatic compounds (NSO) in water and polluted groundwater by solid phase micro-extraction (SPME). *J. High Resolut. Chromatogr.*, 19 (1996) 627-632.
- 452 Moskvina, L.N. and Rodinkov, O.V.: (Chromatographic-membrane vapor phase analysis of aqueous solutions). *Ekol. Khim.*, 4 (1995) 112-116; *C.A.*, 125 (1996) 123030s.

- 453 Nawrocki, J., Kalkowska, I. and Dabrowska, A.: Optimization of solid-phase extraction method for analysis of low-ppb amounts of aldehydes-ozonation by-products. *J. Chromatogr. A*, 749 (1996) 157-163.
- 454 Pörschmann, J., Kopinke, F.-D., Remmler, M., Mackenzie, K., Geyer, W. and Mothes, S.: Hyphenated techniques for characterizing coal wastewater and associated sediments. *J. Chromatogr. A*, 750 (1996) 287-301.
- 455 Santos, F.J., Galceran, M.T. and Fraisse, D.: Application of solid-phase microextraction to the analysis of volatile organic compounds in water. *J. Chromatogr. A*, 742 (1996) 181-189.
- 456 Schieck, D. and Brown, F.: Online analysis of volatile organics in water using head space gas chromatography: Evaluation of five head space techniques. *ISA Trans.*, 35 (1996) 53-58.
- 457 Valor, I., Cortada, C. and Apraiz, D.: Development of a rapid method for the determination of organic microcontaminants in water by means of solid-phase extraction and dual-column techniques for gas chromatography. *Quim. Anal. (Barcelona)*, 14 (1995) 228-232.
- 458 Vitenberg, A.G., Novikaite, N.V. and Bureiko, A.S.: Online gas-chromatographic head-space determination of volatile substances in water. *J. Anal. Chem. (Transl. of Zh. Anal. Khim.)*, 51 (1996) 797-801.
- 459 Zhang, M.: Analysis of organics in aqueous samples by interfacing the direct large volume sample injection with narrow bore column and signal averaging. *Sepu*, 14 (1996) 346-349.
- See also 120, 132, 145, 154, 159, 160, 167, 168, 177, 182, 186, 187, 191, 192, 194, 196, 202, 208, 229, 236, 269, 286, 297, 312, 314, 322, 333, 337, 349, 352, 488.
- 35d. *Soil pollution (complex mixtures; single compounds by cross-reference only)*
- 460 David, M.D. and Seiber, J.N.: Comparison of extraction techniques, including supercritical fluid, high-pressure solvent, and Soxhlet, for organophosphorus hydraulic fluids from soil. *Anal. Chem.*, 68 (1996) 3038-3044.
- 461 Hageman, K.J., Mazeas, L., Grabanski, C.B., Miller, D.J. and Hawthorne, S.B.: Coupled subcritical water extraction with solid-phase microextraction for determining semivolatile organics in environmental solids. *Anal. Chem.*, 68 (1996) 3892-3898.
- See also 146, 152, 156, 157, 161, 163, 177, 193, 271, 292, 324, 325, 341, 354, 364, 488.
36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES
- 36a. *Surfactants*
- See 175.
- 36b. *Antioxidants and preservatives*
- 462 De Witt, B. and Finne, G.: Gas chromatographic determination of butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) in products containing capsaicinoids. *J. Assoc. Off. Anal. Chem.*, 79 (1996) 1459-1462.
- 463 Marín, M.L., Jiménez, A., Lopez, J. and Vilaplana, J.: Analysis of poly(vinyl chloride) additives by supercritical fluid extraction and gas chromatography. *J. Chromatogr. A*, 750 (1996) 183-190.
- See also 230.
- 36c. *Complex mixtures, technical products and unidentified compounds*
- 464 Aginsky, V.N.: Dating and characterizing writing, stamp pad and jet printer inks by gas chromatography/mass spectrometry. *Int. J. Forensic Doc. Exam.*, 2 (1996) 103-116.
- 465 Al-Ismaïl, K., Caboni, M.F. and Lercker, G.: Determination of thermally oxidized oils by capillary gas chromatography (CGC). *Riv. Ital. Sostanze Grasse*, 73 (1996) 327-331.
- 466 Awan, I.A. and Ikramullah: Analysis of the coal by pyrolysis gas chromatography. Effects of internal mineral matters on the yields of lower hydrocarbons. *J. Chem. Soc. Pak.*, 18 (1996) 64-67.
- 467 Bacaud, R. and Rouleau, L.: Coupled simulated distillation-mass spectrometry for the evaluation of hydroconverted petroleum residues. *J. Chromatogr. A*, 750 (1996) 97-104.
- 468 Belgacem, M.N., Blayo, A. and Gandini, A.: Surface characterization of polysaccharides, lignins, printing ink pigments, and ink fillers by inverse gas chromatography. *J. Colloid Interface Sci.*, 182 (1996) 431-436.
- 469 Belgacem, M.N., Czeremuskin, G., Sapielha, S. and Gandini, A.: Surface characterization of cellulose fibers by XPS and inverse gas chromatography. *Cellulose (London)*, 2 (1995) 145-157; *C.A.*, 125 (1996) 198830m.
- 470 Buzaev, V.V., L'vov, Y.N., Smolenskaya, N.Y. and Sapozhnikov, Y.M.: (Gas-chromatographic analysis of transformer oil for Ionol). *Elektr. Stn.*, No. 1 (1996) 51-53; *C.A.*, 125 (1996) 172802d.
- 471 Carbin, M., Stevanato, R., Rovea, M., Traldi, P. and Favretto, D.: Curie-point pyrolysis-gas chromatography/mass spectrometry in the art field. 2 - The characterization of proteinaceous binders. *Rapid Commun. Mass Spectrom.*, 10 (1996) 1240-1242.
- 472 Challinor, J.M.: Characterization of wood extractives by pyrolysis-gas chromatography/mass spectrometry of quaternary ammonium hydroxide extracts. *J. Anal. Appl. Pyrolysis*, 37 (1996) 1-13.
- 473 Elder, D.M., Kildahl, N.K. and Berka, L.H.: Experiments for modern introductory chemistry: identification of arson accelerants by gas chromatography. *J. Chem. Educ.*, 73 (1996) 675-677; *C.A.*, 125 (1996) 113852x.
- 474 Fabbri, D., Chiavari, G. and Galletti, G.C.: Characterization of soil humin by pyrolysis(methylation)-gas chromatography/mass spectrometry: structural relationships with humic acids. *J. Anal. Appl. Pyrolysis*, 37 (1996) 161-172.
- 475 Feng, X. and Yang, N.: (Studies on the hydration properties of chemically-bonded ceramics on CaO-SiO₂-P₂O₅-H₂O system using TMS-GC and ²⁹Si, ³¹P NMR). *Guisuanyan Tongbao*, 15 (1996) 11-17; *C.A.*, 125 (1996) 93795a.

- 476 Gabelish, C.L., Crisp, P. and Schneider, R.P.: Simultaneous determination of chlorophenols, chlorobenzenes and chlorobenzoates in microbial solutions using pentafluorobenzylbromide derivatization and analysis by gas chromatography with electron-capture detection. *J. Chromatogr. A*, 749 (1996) 165-171.
- 477 Galletti, G.C., Bocchini, P. and D'Antuono, L.F.: Fiber composition of a neglected wheat species (*Triticum dicoccum* Schubler) as determined by pyrolysis/gas chromatography/mass spectrometry. *J. Agric. Food Chem.*, 44 (1996) 3133-3135.
- 478 Hashimoto, T.: (GC-MS analysis of gases generated in pyrolysis of mold resins). *Jpn. Kokai Tokkyo Koho JP 08,110,333* [96,110,333] (Cl. G01N30/06), 30 Apr. 1996, Appl. 94/245,827, 12 Oct. 1994; 4 pp.; C.A., 125 (1996) 103793q.
- 479 Keller, M.A. and Saba, C.S.: Oxidative stability and degradation mechanism of a cyclotriphosphazene lubricant. *Anal. Chem.*, 68 (1996) 3489-3492.
- 480 Kulikov, V.I., Vinarsky, V.A. and Yurchenko, R.A.: (Rapid method for analyzing the broad fraction of straight-run gasoline on capillary column with squalene at stepped temperature programming). *Vestsi Akad. Navuk Belarusi, Ser. Khim. Navuk*, No. 1 (1996) 5-10; C.A., 125 (1996) 252423w.
- 481 Kuvshinnikov, I.M. and Kondakov, D.F.: (Quantitative estimation of hygroscopicity of salts and fertilizers using gas chromatography). *Khim. Prom-st. (Moscow)*, No. 1 (1996) 14-20.
- 482 Matz, G. and Lennemann, F.: On-line monitoring of biotechnological process by gas chromatographic-mass spectrometric analysis of fermentation suspensions. *J. Chromatogr. A*, 750 (1996) 141-149.
- 483 Meininghaus, R., Fuhrmann, F. and Salthammer, T.: A routine method for the determination of the TVOC content in wall-coverings using headspace gas chromatography. *Fresenius J. Anal. Chem.*, 356 (1996) 344-347.
- 484 Mills, P.L. and Guise, W.E.Jr.: A multidimensional gas chromatographic method for analysis of *n*-butane oxidation reaction products. *J. Chromatogr. Sci.*, 43 (1996) 431-459.
- 485 Nabivach, V.M.: (Gas-chromatographic study of the composition of a pseudocumene fraction). *Koks Khim.*, No. 6 (1995) 23-28; C.A., 125 (1996) 200513f.
- 486 Niimura, N., Miyakoshi, T., Onodera, J. and Higuchi, T.: Characterization of *Rhus vernicifera* and *Rhus succedanea* lacquer films and their pyrolysis mechanisms studied using two-stage pyrolysis-gas chromatography/mass spectrometry. *J. Anal. Appl. Pyrolysis*, 37 (1996) 199-209.
- 487 Ruchatz, F., Kleinebudde, P. and Mueller, B.W.: Residual solvents in biodegradable microparticles: determination by a dynamic headspace gas chromatographic method. *Int. J. Pharm.*, 142 (1996) 67-73.
- 488 Sawyer, G.M.: Determination of gasoline range, diesel range, and mineral oil range organics in soils and water by flame ionization gas chromatography. *J. Soil Contam.*, 5 (1996) 261-300; C.A., 125 (1996) 131296y.
- 489 Von Seinsche, K., Luigart, F. and Bartl, P.: Quality control of jet fuels. PLS [partial least squares] regression analysis of gas chromatographic and IR spectroscopic data. *Erdoel, Erdgas, Kohle*, 112 (1996) 261-263; C.A., 125 (1996) 119107e.
- See also 104, 141, 148, 173, 176, 180, 186, 218, 290, 300, 346, 460, 492.
37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- See 225.
38. INORGANIC COMPOUNDS
- 38b. Anions
- 490 Nyman, P.J., Canas, B.J., Joe, F.L.Jr. and Diachenko, G.W.: Screening method for the gas chromatographic/mass spectrometric determination of microgram/litre levels of bromate in bottled water. *Food Addit. Contam.*, 13 (1996) 623-631.
- 38c. Permanent and rare gases
- 491 Raj, S.S., Sumangala, R.K., Lal, K.B. and Panicker, P.K.: Gas chromatographic analysis of oxygen and argon at room temperature. *J. Chromatogr. Sci.*, 43 (1996) 465-467.
- 38d. Volatile inorganic compounds
- 492 Akdogan, F.: Multi-channel on-line chromatographic analysis system for quick air-fuel ratio measurement. *J. Chromatogr. A*, 752 (1996) 183-187.
- 493 Brien, J.F., McLaughlin, B.E., Nakatsu, K. and Marks, G.S.: Chemiluminescence headspace-gas analysis for determination of nitric oxide formation in biological systems. *Methods Enzymol.*, 268 (1996) 83-92; C.A., 125 (1996) 216215d.
- 494 Lasa, J., Rosiek, J. and Drozdowicz, B.: Analysis of the possibility of SF₆ detection by a solute switching method with a modulator containing a ⁶³Ni source. *J. Chromatogr. A*, 743 (1996) 301-306.
- 495 Turler, A., Eichler, B., Jost, D.T., Piguat, D., Gaggeler, H.W., Gregorich, K.E., Kadkhodayan, B., Kreek, S.A. and Lee, D.M.: Online gas phase chromatography with chlorides of niobium and hahnium (element 105). *Radiochim. Acta*, 73 (1996) 55-66; C.A., 125 (1996) 264445t.
- See also 35, 114, 481.
39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS
- 496 Sugimoto, A.: GC/GC/IRMS system for carbon isotope measurement of low level methane concentration. *Geochem. J.*, 30 (1996) 195-200; C.A., 125 (1996) 121937u.
- 497 Tobias, H.J. and Brenna, J.T.: High-precision D/H measurement from organic mixtures by gas chromatography continuous-flow isotope ratio mass spectrometry using a palladium filter. *Anal. Chem.*, 68 (1996) 3002-3007.
- See also 114, 149, 495.