

THE MOST IMPORTANT PUBLICATIONS OF A. A. AKHREM ON THE CHEMISTRY OF HETEROCYCLIC COMPOUNDS

1. A. A. Ahrem and Yu. A. Titov. *Total Syntheses of Steroids* [in Russian], Nauka, Moscow, 1967, 322 pp.
2. A. A. Akhrem, A. M. Moiseenkov, V. A. Krivorychko, F. A. Lakhvich, and A. I. Poslenov. Routes to the synthesis of 8-azasteroids. 1. Synthesis and some properties of benzo[*a*]cycloalkano[*f*]quinolizines. *Izv. Akad. Nauk SSSR, Ser. Khim.*, 2078-2083 (1972).
3. A. A. Akhrem, A. M. Moiseenkov, and A. I. Poslenov. Route to the synthesis of 8-azaestrane based on benzo[*a,f*]cycloalkanoquinolizines. *Dokl. Akad. Nauk*, **203**, 95-98 (1972).
4. A. A. Akhrem, A. M. Moiseenkov, and A. I. Poslenov. Route to the synthesis 8-azasteroids 2. Bayer-Villiger oxidation of dibenzo[*a,f*]quinazoline vinylogs of lactams. *Izv. Akad. Nauk SSSR, Ser. Khim.*, 2579-2584 (1972).
5. A. A. Akhrem, A. M. Moiseenkov, A. I. Poslenov, and V. A. Krivorukko. 1,3-Additions of 2-acetyl-cycloalkandiones-1,3 to N-oxides of 3,4-dihydroisoquinoline. *Dokl. Akad. Nauk*, **210**, 841-843 (1973).
6. A. A. Akhrem, A. M. Moiseenkov, and V. A. Krivoruchko. Route to the synthesis of 8-azasteroids. 3. Condensation of 3,4-dihydroisoquinolines with derivatives of dehydroacetic acids. *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1302-1307 (1973).
7. A. A. Akhrem, A. M. Moiseenkov, A. I. Poslenov, and V. A. Krivorukko. Routes to 8-azasteroids. 4. *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1853-1858 (1973).
8. A. A. Akhrem, A. M. Moiseenkov, V. A. Krivorukko, V. S. Malishevskii, and Yu. G. Chernov. New syntheses of benzo[*a*]- and indolo[*a*]quinolizidines. *Dokl. Akad. Nauk*, **209**, 605-606 (1973).
9. A. A. Akhrem, A. M. Moiseenkov, V. S. Malishevskii, and Yu. G. Chernov. Condensation of cyclic Schiff's bases with acetyl- ω -lactones as a new synthesis of benzo[*a*]- and indolo[*a*]quinolizines. *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1306-1311 (1973).
10. A. A. Akhrem, A. M. Moiseenkov, and V. S. Malishevskii. Synthesis of tetrahydroprotoberberine. *Dokl. Akad. Nauk*, **208**, 1089-1090 (1973).
11. A. A. Akhrem, A. M. Moissenkov, F. A. Lakhvich, A. I. Poselenov, V. A. Krivoruchko, V. N. Pshenichnyi, and O. F. Lakhvich. A total synthesis of 8-azasteroids. *J. Steroid Biochem.*, **5**, 300 (1974).
12. A. A. Akhrem, F. A. Lakhvich, V. N. Pshenichnyi, O. F. Lakhvich, and B. B. Kuz'mitskii. Synthesis and biological activity of derivatives of 8,16-diazasteroids. *Dokl. Akad. Nauk*, **240**, 595-597 (1978).
13. A. A. Akhrem, F. A. Lakhvich, L. G. Lis, and V. N. Pshenichnyi. New synthesis of 8-aza-16-oxasteroids. *Dokl. Akad. Nauk BSSR*, **22**, 431-433 (1978).
14. A. A. Akhrem, F. A. Lakhvich, L. G. Lis, and V. N. Pshenichnyi. Heterocyclic analogs of steroids. 5. Synthesis and some properties of 8-aza-16-oxanonan-12,17-diones. *Zhur. Org. Khim.*, **15**, 1396-1402 (1979).

Translated from *Khimiya Geterotsiklicheskikh Soedinenii*, No. 3, pp. 328-334, March, 2008. Original article submitted February 4, 2008.

15. A. A. Akhrem and Yu. G. Chernov. A new annelation reaction of cyclic Schiff bases. *Dokl. Akad. Nauk*, **255**, 865-866 (1980).
16. A. A. Akhrem and Yu. G. Chernov. A new annelation reaction of cyclic Schiff bases. *Synthesis*, 996 (1980).
17. A. A. Akhrem, F. A. Lakhvich, S. U. Sagaidak, N. I. Garbuz, and V. Z Kurbako. Heterocyclic analogs of steroids. 7. Ionic hydrogenated cyclic enamino diketones of the 8-azasteroids. *Zhur. Org. Khim.*, **17**, 1527-1532 (1981).
18. A. A. Akhrem, F. A. Lakhvich, L. G. Lis, and B. B. Kuz'mitskii. New synthesis, structure, and functions of 8-azasteroids – a new class of biologically active compound. *Izv. Akad. Nauk BSSR, Ser. Khim. Nauk*, No. 6, 81-90 (1982).
19. A. A. Akhrem and Yu. G. Chernov. New synthesis of octahydro[2,3-*a*]quinolizinedione-2,4. *Dokl. Akad. Nauk*, **271**, 869-870 (1983).
20. A. A. Akhrem, F. A. Lakhvich, A. N. Pyrko, and L. G. Lis. Heterocyclic analogs of steroids. VIII. A new method for the synthesis 8-aza-16-oxasteroids. *Zhur. Org. Khim.*, **20**, 2565-2570 (1984).
21. V. N. Pshenichnyi, N. I. Golub, R. P. Litvinovskaya, and A. A. Akhrem. Synthesis of 12-keto-8-azagonanes and their transformations. *Izv. Akad. Nauk BSSR, Ser. Khim.*, No. 4, 96-101 (1984).
22. F. A. Lakhvich, L. G. Lis, and A. A. Akhrem. New synthesis of 8-azasteroids. *Uspekhi Khimii*, **53**, 1014-1044 (1984).
23. A. A. Akhrem, B. B. Kuz'mitskii, F. A. Lakhvich, V. A. Khripach, and Yu. L. Zhuravkov. Investigation of selected immunotropic substances of the heterosteroid class, in: *Chemistry and Biology of Immunoregulators*. Zinātne, Riga, 1985, 265-278.
24. A. A. Akhrem, V. Z. Kurbako, O. V. Gulyakevich, V. P. Pshenichnyi, V. A. Khripach, and I. A. Garbuz. Photochemical oxidative dehydrogenation of cyclic enamino ketones of the 8-azasteroid series. *Khim. Geterocycl. Soedinen.*, 1135 (1985). [*Chem. Heterocycl. Comp.*, **21**, 953 (1985)].
25. A. A. Akhrem, F. A. Lakhvich, L. G. Lis, B. B. Kuz'mitskii, N. A. Mizulo, and I. A. Gorbacheva. Heterocyclic analogs of steroids XIV. Synthesis and some properties of some conjugated enamino lactones of the 8-aza-16-oxasteroids series. *Zhur. Org. Khim.*, **21**, 1348-1354 (1985).
26. A. A. Akhrem, B. N Pshenichnyi, O. V. Gulyakevich, and V. A. Khripach, Synthesis of 3,4-dioxo-2,3,4,5,6,7-hexahydrodibenzo[*b*]furans. *Khim. Geterotsikl. Soedin.*, 1130 (1985). [*Chem. Heterocycl. Comp.*, **21**, 947 (1985)].
27. A. A. Akhrem, and Yu. G. Chernov. New reactions in a series of Schiff bases: synthesis of 2-tetrahydroquinolyl-1,3-dicarbonyl compounds. *Dokl. Akad. Nauk*, **291**, 603-604 (1986).
28. A. A. Akhrem, and Yu. G. Chernov. New synthesis of 2-tetrahydroquinolyl-1,3-dicarbonyl compounds. *Dokl. Akad. Nauk*, **298**, 616-617 (1988).
29. A. A. Akhrem, and Yu. G. Chernov. New reactions of annelated cyclic Schiff bases with keto ethers. *Dokl. Akad. Nauk*, **299**, 128-129 (1988).
30. A. A. Akhrem, E. V. Borisov, and Yu. G. Chernov. Interaction of 3,4-dihydroisoquinolines with 3-acyloxy-2-cycloalken-1-ones: synthesis and structure of 2-(2-acyl-1-tetrahydroisoquinolinyl)cycloalkane-1,3-diones. *Zhur. Org. Khim.*, **26**, 1114-1125 (1990).
31. A. L. Mikhal'chuk, O. V. Gulyakevich, A. A. Zepok, A. V. Korchik, L. G. Lis, V. A. Khripach, and A. A. Akhrem. Regio- and stereoselectivity of the reaction of the annelation reaction of cyclic Schiff bases with structurally unsymmetrical 2-acetyl-1,3-cyclohexanediones. *Dokl. Akad. Nauk*, **317**, 1397-1401 (1991).
32. A. L. Mikhal'chuk, O. V. Gulyakevich, and A. A. Akhrem. Dithiolane derivatives of 8-aza-D-homogona-1,3,5(10),13-tetraene-12,17a-dione. *Zhur. Org. Khim.*, **28**, 1771-1772 (1992).

33. A. L. Mikhal'chuk, A. I. Verenich, O. V. Gulyakevich, and A. A. Akhrem. Electronic isomers and crystals of α -alkyl- β -aminovinylcarbonyl compounds of the 8-azasteroid series. Mesomeric tautomerism. *Dokl. Akad. Nauk*, **323**, 82-86 (1992).
34. A. L. Mikhal'chuk, O. V. Gulyakevich, D. B. Rubinov, and A. A. Akhrem. Structure and properties of 8-azasteroids, synthesized by regio- and stereoselective annelation of 3,4-dihydroisoquinolines with unsymmetrical 2-acyl-1,3-dicyclohexanediones. *Khim. Geterotsikl. Soedin.*, 374-382 (1993). [*Chem. Heterocycl. Comp.*, **29**, 313-320 (1993)].
35. O. V. Gulyakevich, A. L. Mikhal'chuk, and A. A. Akhrem. C-9 and C-11-ethyl derivatives of 8-aza-D-homogonanes. The role of steric factors in carrying out the annelation of cyclic Schiff bases with β -triketones. *Khim. Geterotsikl. Soedin.*, 1239-1245 (1993). [*Chem. Heterocycl. Comp.*, **29**, 1059-1064 (1993)].
36. O. V. Gulyakevich, A. L. Mikhal'chuk, and A. A. Akhrem. Reactions of 2-chloroacetyl-1,3-cyclohexanediones with cyclic Schiff bases. A new route to 8-aza-D-homogona-1,3,5(10), 13, 9(11)-pentaene-12,17a-dione. *Khim. Geterotsikl. Soedin.*, 1368-1373 (1993). [*Chem. Heterocycl. Comp.*, **29**, 1172-1177 (1993)].
37. A. L. Mikhal'chuk, O. V. Gulyakevich, and A. A. Akhrem. Angular alkylation of 8-aza-D-homogonanes. *Khim. Geterotsikl. Soedin.*, 86-93 (1993). [*Chem. Heterocycl. Comp.*, **29**, 74-80 (1993)].
38. A. L. Mikhal'chuk, O. V. Gulyakevich, A. A. Zenyuk, Yu.V. Shklyaev, and A. A. Akhrem. Methylated derivatives of 8-azasteroids. Limits of the use of the annelation reaction for cyclic Schiff bases with β -triketones. *Zhur. Org. Khim.*, **63**, 1891-1898 (1993).
39. A. L. Mikhal'chuk, O. V. Gulyakevich, V. P. Peresada, A. M. Likhosherstov, and A. A. Akhrem. 5,8-Diaza-analogs of steroids. Annelation of 3,4-dihydropyrrolo[1,2-a]pyrazine with 2-acetyl-1,3-cycloalkanediolines. *Zhur. Org. Khim.*, **63**, 701-702 (1993).
40. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. Interaction of 8-aza-D-homogona-1,3,5(10),13-tetraene-12,17a-dione with N-bromosuccinimide. *Khim. Geterotsikl. Soedin.*, 1144-1145 (1993). [*Chem. Heterocycl. Comp.*, **29**, 978-979 (1993)].
41. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. Regioselective bromination of 8-aza-D-homogona-1,3,5 (10), 13,9(11)-pentaene-12,17a-dione with N-bromosuccinimide. *Zhur. Org. Khim.*, **29**, 1641-1642 (1993).
42. A. L. Mikhail'chuk, O. V. Gulyakevich, and A. A. Akhrem. Selective aromatization of D-8-aza-D-homogona-1,3,5(10),13-tetraene-12,17a-diones with N-bromosuccinimide. *Zhur. Obshch. Khim.*, **63**, 1917-1918 (1993).
43. A. L. Mikhail'chuk, O. V. Gulyakevich, K. A. Krasnov, V. I. Slesarev, and A. A. Akhrem. Annelation of 3,4-dihydroisoquinolines with 5-acylbarbituric acids. A route to the synthesis of 8,15,17-triaza-D-homogonanes. *Zhur. Org. Khim.*, **29**, 1236-1237 (1993).
44. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. Synthesis and properties of 8-aza-D-homogonanes with functionalized substituents at C-11. *Zhur. Obshch. Khim.*, **64**, 1544-1549 (1994).
45. A. L. Mikhail'chuk, O. V. Gulyakevich, D. B. Rubinov, and A. A. Akhrem. Halogenation of 8-aza-D-homogonanes. *Zhur. Obshch. Khim.*, **64**, 1041-1047 (1994).
46. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. Synthesis of 11-N-arylaminoethylene derivatives of 8-azasteroids. A new reaction in a series of cyclic Schiff bases. *Khim. Geterotsikl. Soedin.*, 266-267 (1995). [*Chem. Heterocycl. Comp.*, **31**, 235-236 (1995)].
47. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. Synthesis and properties of dithioacetal of conformationally limited α -acyl- β -aminovinyl ketones of the 8-azasteroid series. *Khim. Geterotsikl. Soed.*, 187-194 (1995). [*Chem. Heterocycl. Comp.*, **31**, 160-166 (1995)].

48. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. Functionalization of 8-aza-D-homogona-1,3,5(10),13-tetraene-1,17a-diones at positions 11 and 17 under conditions of the Claisen ester condensations. Synthesis and properties of 11- and 17-acylsubstituted 8-aza-D-homogonanes. *Khim. Geterotsikl. Soedin.*, 959-965 (1995). [*Chem. Heterocycl. Comp.*, **31**, 835-840 (1995)].
49. O. V. Gulyakevich, A. L. Mikhail'chuk, A. I. Verenich, D. B. Rubinov, A. A. Zenyuk, and A. A. Akhrem. Regio- and stereoselective annelation of cyclic Schiff bases with unsymmetrical 2-acyl-1,3-cyclohexanediones, in: V. S. Shklyev (editor), *Enamines in Organic Synthesis*. Ural Branch of the Russian Acad. Sci., Ekaterinburg, 1996, pp. 111-132.
50. A. L. Mikhail'chuk, O. V. Gulyakevich, and A. A. Akhrem. Synthesis of aryl-substituted benzo[*a*]quinolizines by cyclocondensation of azomethines with arylidenemalonates. *Khim. Geterotsikl. Soedin.*, 235-236 (1996). [*Chem. Heterocycl. Comp.*, **32**, 210-211 (1996)].
51. A. L. Mikhail'chuk, O. V. Gulyakevich, V. P. Peresada, A. M. Likhosherstov, and A. A. Akhrem. A new general synthesis of condensed azines with a heteroatom in the fused rings. Annelation of cyclic azomethines with aminomethylenecycloalkanones. *Dokl. Akad. Nauk*, **356**, 769-772 (1997).
52. A. L. Mikhail'chuk, O. V. Gulyakevich, Yu. V. Shklyaev, V. S. Shklyaev, and A. A. Akhrem. Salts of 2-acetyl-cyclopenta-1,3-dione with 3,4-dihydroisoquinolines. *Zhur. Obshch. Khim.*, **67**, 2062-2063 (1997).
53. A. L. Mikhail'chuk, O. V. Gulyakevich, and A. A. Akhrem, Synthesis of new derivatives of benzo[*a*]quinolizidine by heterocondensation of cyclic azomethines with benzylidenemalonates. *Zhur. Org. Khim.*, **33**, 639-640 (1997),
54. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. [3+3] Cyclocondensations of 1-alkylsubstituted 3,4-dihydroisoquinolines with 2-aminomethylenecycloalkane-1,3-diones or aminomethylenemalonates – new annelation reactions in the cyclic Schiff base series. *Izv. Akad. Nauk, Ser. Khim.*, 1358-1360 (1997).
55. O. V. Gulyakevich, A. L. Mikhail'chuk, V. P. Peresada, A. M. Likhosherstov, and A. A. Akhrem. [3+3] Cyclodensation of aminomethylenecycloalkanes with cyclic azomethines – a new route to condensed nitrogen-containing heterocycles. *Khim. Geterotsikl. Soedin.*, 972-974 (1997). [*Chem. Heterocycl. Comp.*, **33**, 851-853 (1997)].
56. A. L. Mikhail'chuk, O. V. Gulyakevich, V. P. Peresada, A. M. Likhosherstov, and A. A. Akhrem. A new general synthesis of condensed azines with a heteroatom in the fused rings. Annelation of cyclic azomethines with aminomethylenecycloalkanones. *Dokl. Akad. Nauk*, **356**, 769-772 (1997).
57. A. L. Mikhail'chuk, O. V. Gulyakevich, and A. A. Akhrem. New route for the construction of 8-azagonane tetracycle by annelation of 1-methyl-3,4-dihydroisoquinolines with 2-dimethylaminomethylenecyclopentanone. *Zhur. Obshch. Khim.*, **67**, 1223-1224 (1997).
58. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. New synthesis of benzo[*a*]quinolizines by cyclocondensation of 1-alkyl-3,4-dihydroisoquinolines with aminomethylenemalonates. *Khim. Prirod. Soed.*, 432-433 (1997).
59. A. A. Akhrem, N. A. Borisevich, O. V. Gulyakevich, A. L. Mikhail'chuk, T. F. Raichenok, and G. B. Tolstorozhev. The basic properties of luminescent immunoactive molecules of 8-azasteroids, in: *Proc. IIIrd Conf. on Laser Physics and Spectroscopy (Grodno, 2-4 July 1997)*. B. I. Stepanov Institute of Physics, Belarus Academy of Science, Minsk (Belarus), 1997, Vol. 2, pp. 167-170.
60. A. L. Mikhail'chuk, O. V. Gulyakevich, Yu. V. Shklyaev, V. S. Shklyaev, and A. A. Akhrem. Salts of alkylsubstituted 3,4-dihydroisoquinolines with 2-acetyl-cyclopentane-1,3-diones. *Khim. Geterotsikl. Soedin.*, 681-690 (1998). [*Chem. Heterocycl. Comp.*, **34**, 602-610 (1998)].
61. A. L. Mikhail'chuk, O. V. Gulyakevich, and A. A. Akhrem. Cyclocondensation of α -hydroxy-methylenecarbonyl compounds with cyclic azomethines. *Zhur. Prikl. Khim.*, **71**, 645-647 (1998).

62. A. L. Mikhail'chuk, O. V. Gulyakevich, and A. A. Akhrem. New synthesis of a dibenzo[*a,f*]quinolizine tetracycle – cyclocondensation of 1-methyl-3,4-dihydroisoquinolines with 2-dimethylaminomethylene-cyclohexanone. *Zhur. Org. Khim.*, **34**, 635-636 (1998).
63. A. A. Akhrem, N. A. Borisevich, O. V. Gulyakevich, T. F. Raichenyuk, and G. B. Tolstorozhev. Fluorescence of solutions of 8-azasteroids with α -acyl- β -aminovinylcarbonyl and imminium groups. *Zhur. Prikl. Spektrosk.*, **65**, 315-318 (1998). [*J. Appl. Spectrosc.*, **65**, 323-326 (1998)].
64. O. V. Gulyakevich, A. L. Mikhail'chuk, A. S. Lyakov, I. P. Antonevich, A. A. Govorova, and A. A. Akhrem. 17 α -Acetoxy-16,16-dimethyl-8-aza-D-gomona-1,3,5(10),9(11), 13,17-hexaen-12-one – the product of acylotropy on the interaction of 16,16-dimethyl-8-aza-D-gomona-1,3,5(10),9(11), 13-pentaene-12,17 α -dione with acetic anhydride. *Khim. Geterotsikl. Soedin.*, 1376-1387 (1999). [*Chem. Heterocycl. Comp.*, **35**, 1196-1206 (1999)].
65. A. A. Akhrem, I. A. Borisevich, A. L. Mikhail'chuk, and G. B. Tolstorozhev. Electronic structure and spectroscopy of biomolecules of the 8-azasteroid class, in: *Laser Physics and Spectroscopy. Proc. IV International Conf. on Laser Physics and Spectroscopy*, Vol. 1. Grodno State Univ., Grodno (1999), pp. 14-17.
66. A. A. Akhrem, N. A. Borisevich, O. V. Gulyakevich, V. N. Knyukshto, A. L. Mikhail'chuk, S. A. Tikhomirov, and G. B. Tolstorozhev. Electronic luminescence of microcrystals of 8-azasteroids. *Zhur. Prikl. Spektrosk.*, **66**, 440-443 (1999). [*J. Appl. Spectrosc.*, **66**, 447-480 (1999)].
67. A. A. Akhrem, N. A. Borisevich, O. V. Gulyakevich, A. L. Mikhail'chuk, T. F. Raichopok, S. A. Tikhomirov, and G. B. Tolstorozhev. Specific fluorescence properties and picosecond transient absorption of 8-azasteroids. *J. Fluoresc.*, **9**, 357-361 (1999).
68. A. A. Akhrem, O. V. Gulyakevich, and A. L. Mikhail'chuk. Annelation of cyclic Schiff bases or azomethines with β -di- or β,β' -tricarbonylcompounds – [2+4] dipole-dipole heterocyclostructures (limits of use, mechanism, perspectives), in: Yu. V. Shklyaev (editor), *Enamines in Organic Synthesis*, Ural Branch of the Russian Acad. Sci., Ekaterinburg, 2001, pp. 47-94.
69. A. A. Akhrem, N. A. Borisevich, A. A. Govorova, O. V. Gulyakevich, A. S. Lyakhov, A. L. Michail'chuk, I. V. Skornyakov, and G. B. Tolstorozhev. Molecular and crystal structure of 6,6-dimethyl-2,3,4,5,6,7-hexahydrobenzo[*b*]furan-3,4-dione. *Zhur. Prikl. Spectrosk.*, **68**, 303-307 (2001). [*J. Appl. Spectrosc.*, **68**, 394-400 (2001)].
70. A. A. Akhrem, O. V. Gulyakevich, G. N. Lysenko, A. L. Mikhail'chuk, and G. B. Tolstorozhev. IR spectra and structure of immunoactive 8-azasteroids and model compounds. *Zhur. Prikl. Spectrosk.*, **68**, 427-432 (2001). [*J. Appl. Spectrosc.*, **68**, 554-561 (2001)].
71. A. A. Akhrem, O. V. Gulyakevich, G. N. Lysenko, A. L. Mikhail'chuk, and G. B. Tolstorozhev. IR Spectra of derivatives of immunotropic 8-azasteroids. *Zhur. Prikl. Spectrosk.*, **68**, 551-556 (2001). [*J. Appl. Spectrosc.*, **68**, 719-726 (2001)].
72. A. A. Akhrem, N. A. Borisevich, O. V. Gulyakevich, A. L. Mikhail'chuk, T. F. Raichenyuk, S. A. Tikhomirov, and G. B. Tolstorozhev. Absorption spectra and fluorescence of 8-aza(D-homo)gona-12,17(α)-diones, in: Yu. V. Shklyaev (editor), *Enamines in Organic Synthesis*, Ural Branch of the Russian Acad. Sci., Ekaterinburg, 2001, pp. 29-38.
73. V. Ya. Artyukhov, A. A. Akhrem, N. A. Borisevich, V. A. Ksenzov, V. G. Maier, A. L. Mikhail'chuk, and G. V. Tolstorozhev. Electronic structure of the molecule of immunoactive 8-azagona-12,17-dione. *Zhur. Priklad. Spektrosk.*, **68**, 5-10 (2001). [*J. Appl. Spectrosc.*, **68**, 1-8 (2001)].
74. A. A. Akhrem, N. A. Borisevich, O. V. Gulyakevich, A. L. Mikhail'chuk, T. F. Raichenyuk, A. A. Sukhodola, and G. V. Tolstorozhev. Characteristics of the absorption spectra and fluorescence of immunoactive 8-azasteroids. *Optika i Spektrosk.*, **91**, 232-236 (2001). [*Opt. Spectrosc.*, **91**, 214-218 (2001)].

- 75 A. Akhrem, O. V. Gulyakevich, and A. L. Mikhail'chuk. Synthesis of condensed quinolizine derivatives through annelation of cyclic Schiff bases: [2+4] cyclocondensation, in: V. G. Kartsev and G. A. Tolstikov (editors), *Nitrogen-containing heterocycles and alkaloids. Proc. Ist Int. Conf. on the chemistry and biological activity of nitrogen-containing heterocycles and alkaloids: Moscow, October 9-12, 2001.* Iridium Press, Moscow, 2001, Vol. 1, pp. 19-32.
76. A. A. Akhrem, O. V. Gulyakevich, and A. L. Mikhail'chuk. [3+3] Cyclocondensation of cyclic Schiff bases in the synthesis of annelated quinolizine derivatines, in: V. G. Kartsev (editor), *Selected methods for synthesis and modification of heterocycles.* Interbioscreen monograph series.. IBS Press, Moscow, 2002, Vol. 1, pp. 7-26.
77. A. A. Akhrem, A. A. Govorova, O. V. Gulyakevich. A. S. Lyakhov, A. L. Mikhail'chuk, I. V. Skornyakov, and G. B. Tolstorozhev. Intermolecular interactions in crystals of 8-aza-D-homogon and its derivatives in IR spectra. *Zhur. Prikl. Spektrosk.*, **71**, 145-151 (2004). [*J. Appl. Spectrosc.*, **71**, 156-163 (2004)].
78. O. V. Gulyakevich, P. V. Kurman, A. I. Mikhail'chuk, and A. A. Akhrem. AB + D → ABCD route for the construction of the 8-azasteroid skeleton of [3+3] cyclocondensation of 3,4-dihydroisoquinolines with ethyl esters of 2-oxocyclopentancarboxylates – a new reaction for annelation in a series of Schiff bases. *Izv. Akad. Nauk, Ser. Khim.*, 378-380 (2004). [*Russ. Chem. Bull.*, **53**, 393-395 (2004)].
79. A. A. Akhrem, O. V. Gulyakevich, and A. L. Mikhail'chuk. Tautomerism and reactivity of heterocyclic β,β'-tricarbonyls and their anions, in: V. G. Kartsev (editor), *The chemistry and biological activity of synthetic and natural compounds. Oxygen- and sulfur-containing heterocycles, Proc. II Int. Conf. on the chemistry and biological activity of oxygen- and sulfur-containing heterocycles. Moscow, October 14-17, 2003.* InterBioScreen Ltd. [et al.], IBS Press, Moscow, 2003, Vol. 1, pp. 161-167.
80. O. V. Gulyakevich, K. A. Krasnov, A. L. Mikhail'chuk, and A. A. Akhrem. Interaction of cyclic Schiff bases with enolates of pyrimidine-4,6-diones: synthesis of 5-(2-acetyl-6,7-dimethoxy-1,2,3,4-tetrahydro-1-isoquinolinyl)-6-hydroxy-2-methylsulfeny-1,4-dihydro-4-pyrimidinones. *Khim. Geterotsikl. Soedin.*, 1233-1240 (2004). [*Chem. Heterocycl. Comp.*, **40**, 1070-1076 (2004)].
81. A. A. Akhrem, A. A. Govorova, O. V. Gulyakevich, A. S. Lyakhov, A. L. Mikhail'chuk, I. V. Skornyakov, and G. B. Tolstorozhev. Intermolecular interactions of immunoactive 8-azasteroids. *Optika i spektrosk.*, **99**, 82-88 (2005). [*Opt Spectrosc.*, **99**, 74-80 (2005)].
82. A. A. Akhrem, O. V. Gulyakevih, and A. L. Mikhail'chuk. On the mechanism of [2+4] annelation of Schiff bases with β-di- and β,β'-tricarbonyl compounds, in: R. R. Kostikov (editor), *Organic Chemistry from Butlerov and Beilstein to the Present Day. Proc. Int. Conf.*, St. Petersburg, June 26-29, 2006. SPbSU, SPbSTI, D. I. Mendeleev Chemical Society, Russian Acad. Sci., St. Petersburg, 2006, pp. 572-576.
83. A. A. Akhrem, O. V. Gulyakevich, and A. L. Mikhail'chuk. [2+4] Cyclocondensations of monocyclic azomethines with β-di- and β,β'-tricarbonyl compounds in synthesis of azangular heterocycles, in: V. G. Kartsev (editor), *The chemistry and biological activity of synthetic and natural compounds. Nitrogen-containing heterocycles. Proc. III Int. Conf. on the Chemistry and biological activity of synthetic and natural compounds. Chernogolovka, June 20-23, 2006.* ICSPF, Moscow, 2006, Vol. 1. pp. 15-19.
84. A. L. Mikhail'chuk, O. V. Gulyakevich, Z. V. Baranovskii, and A. A. Akhrem. Synthesis and structural investigation of 12-oximino derivatives of 16,16-dimethyl-8-aza-D-homogona-1,3,5(10)-13-tetraene-12,17a-dione. *Khim. Geterotsikl. Soedin.*, 415-429 (2007). [*Chem. Heterocycl. Comp.*, **43**, 336-346 (2007)].
85. O. V. Gulyakevich, A. L. Mikhail'chuk, and A. A. Akhrem. Mechanism of [2+4] cyclocondensation of Schiff bases with β-di- and β,β'-tricarbonyl compounds, in: *XVIII Mendeleev Meeting on General and Natural Chemistry. Abstr. of papers, Moscow, 23-28 September, 2007.* Granitsa, Moscow, 2007. Vol. 1, Section 1. *Achievements and perspectives of chemical science*, p.186.