

LIST OF PUBLICATIONS  
of  
Academician Alexander G. Petrov, PhD, DSc  
Fellow of the Bulgarian Academy of Sciences  
DIRECTOR  
Institute of Solid State Physics,  
Bulgarian Academy of Sciences,  
Sofia, Bulgaria

MONOGRAPHS

1. The Lyotropic State of Matter: Molecular Physics and Living Matter Physics  
A.G. Petrov  
Gordon & Breach Science Publishers, L.-N.Y. (1999), 549 pp.

Lyotropic State of Matter ( *eBook Edition* )

By Alexander G. Petrov

Publisher: Taylor & Francis, Publish Date: 04/17/2007

EDITED BOOKS

1. Materials for Information Technology in the New Millenium  
Proc. of the 11<sup>th</sup> International School on Condensed Matter Physics, Varna 2000  
Edited by J.M.Marshall, A.G.Petrov, A.Vavrek, D.Nesheva, D.Dimova-  
Malinovska, J.M.Maud  
Bookcraft, Bath (2001)
2. Jubilee Collection. 30<sup>th</sup> Anniversary of the Institute of Solid State Physics (1972-  
2002),  
Edited by A.G.Petrov, ISSP, Sofia (2002).
3. Contemporary Trends in Condensed Matter Physics and Technology  
Proc. of the 12<sup>th</sup> International School on Condensed Matter Physics, Varna 2002  
Edited by J.M.Marshall, A.G.Petrov, A.Vavrek, D.Nesheva, D.Dimova-  
Malinovska, J.M.Maud  
J.Mat.Sci.: Mat.Electr. vol. 14, Nos 10-12 (2003)
4. Advances in the Physics and Technology of Solids and Soft Condensed Matter  
  
Proc. of the 13<sup>th</sup> International School on Condensed Matter Physics, Varna 2004  
Edited by J.M.Marshall, AG.Petrov, D.Nesheva, D.Dimova-Malinovska, J.M.Maud  
J.Optoelectr.Adv.Mat. vol 7, No 1 (2005)
5. Advances in the Micro and Nano Physics of Solid and Soft Matter  
Proc. of the 15<sup>th</sup> International School on Condensed Matter Physics, Varna 2006  
Edited by D.Dimova-Malinovska, J.M.Marshall, D.Nesheva, AG.Petrov,  
M.Primatarova

PAPERS

1. NMR Fourier spectroscopy in liquid crystals  
A. Derzhanski, S. Naydenova, L. Grigorov, A. G. Petrov  
Proc. XVth Congress AMPERE, Bucharest, p.841 (1971)
2. Dielectric properties of nematic liquid crystal with ellipsoidal molecules  
A. Derzhanski, A. G. Petrov  
Compt. rend. Acad. bulg. Sci. **24**, 569 (1971)
3. Molecular parameters and dielectric anisotropy of liquid crystal  
p-azoxyanisole  
A. G. Petrov  
Compt. rend. Acad. bulg. Sci. **24**, 573 (1971)
4. A possible relationship between the dielectric permeability and the  
piezoelectric properties of nematic liquid crystals  
A. Derzhanski, A. G. Petrov  
Phys. Lett. **34A**, 427 (1971).
5. Inverse currents and contact behaviour of some nematic liquid crystals  
A. Derzhanski, A. G. Petrov  
Phys. Lett. **36A**, 307 (1971)
6. A molecular-statistical approach to the piezoelectric properties of  
nematic liquid crystals  
A. Derzhanski, A. G. Petrov  
Phys. Lett. **36A**, 483 (1971).
7. Electroconductivity of some nematic liquid crystals (in Russian)  
A. Derzhanski, A.G.Petrov, R.Peeva  
Proc.Internat.Conf.Amorph.,Glass & Liq.Semicond.,Sofia1972, pp109-112.
8. A molecular statistical approach to the piezoelectric properties of  
nematic liquid crystals - one-dimensional model  
A. Derzhanski, A. G. Petrov  
Compt. rend. Acad. bulg. Sci. **25**, 167 (1972).
9. Piezoelectric deformations of nematic liquid crystals in  
nonhomogeneous d.c. electric field  
A. Derzhanski, A. G. Petrov, Chr. P. Khinov, B. L. Markovski  
Bulg. J. Phys. **1**, 165 (1974).
10. Electric polarization of nematic liquid crystals - dielectric and piezoelectric  
properties (in Bulgarian)  
A. G. Petrov  
Ph.D.Thesis, Institute of Solid State Physics, Bulgarian Academy of Sciences,  
Sofia 1974.
11. One-dimensional approach to the spontaneous deformations in nematic  
liquid crystals  
A. Derzhanski, A. G. Petrov, I. Bivas

- Compt. rend. Acad. bulg. Sci. **28**, 1327 (1975).
12. Flexoelectric model for active transport  
A. G. Petrov  
In: Physical and Chemical Bases of Biological Information Transfer, Plenum Press, N. Y. -L. (1975) p. 111.
  13. Electrooptic study of nematic liquid crystal ZLI-207 (in Bulgarian)  
S.Sokerov, N.Aneva, P.Stefanov, A.G.Petrov, S.Stoylov, V.Encheva  
Izv. Khimia (Sofia) **9**, 304 (1976)
  14. On some problems in the theory of elastic and flexoelectric effects in bilayer lipid membranes and biomembranes  
A. G. Petrov, A. Derzhanski  
J. Physique suppl. **37**, C3-155 – C3-160 (1976).
  15. Flexoelectric effects and transport phenomena in biomembranes  
A. G. Petrov  
Fourth Winter School Biophys. Membrane Transport, Poland (1977)  
School Proceeding, vol. 3, p. 168 - 176.
  16. Flexoelectricity and surface polarization  
A. G. Petrov, A. Derzhanski  
Mol. Cryst. Liq. Cryst. Lett. **41**, 41 (1977).
  17. Flexoelectric aspects of lipid-protein interaction in biomembranes  
A.G.Petrov, V.A.Tverdislov, A.Derzhanski  
Ann. Phys. **3**, 273. 4 (1978).
  18. Molecular asymmetry and saddle-splay elasticity in lipid bilayers  
A. Derzhanski, A. G. Petrov, M. D. Mitov  
Ann. Phys. **3**, 297 (1978).
  19. Saddle splay instability in lipid bilayers  
A. G. Petrov, M. D. Mitov, A. Derzhanski  
Phys. Lett. **65A**, 374 (1978).
  20. One-dimensional dielectric-flexoelectric deformations in nematic layers  
A. Derzhanski, A. G. Petrov, M. D. Mitov  
J. Physique **39**, 273 (1978).
  21. Mechanisms of curvature-induced membrane polarization and their influence on some membrane properties  
A. G. Petrov  
studia biophysica **74**, 51 (1978), and Microphiche 4/ 14-25
  22. Electrohydrodynamic instability in planar, positive dielectric anisotropy nematic layers at d.c. excitation  
A. G. Petrov  
J. Physique suppl. **40**, C3-310 (1979).
  23. A new model for flexoelectric polarization of bilayer lipid membranes at blocked "flip-flop"  
A. G. Petrov, Y.V.Pavloff  
J. Physique suppl. **40**, C3-455 (1979).
  24. Principles and methods of liquid crystal physics applied to the structure and functions of biological membranes  
A. G. Petrov, S. A. Seleznev, A. Derzhanski  
Acta. Phys. Polonica **A55**, 385-405 (1979).

25. Flexoelectricity in nematic liquid crystals  
A. Derzhanski, A. G. Petrov  
*Acta Phys. Polonica* **A55**, 747 (1979).
26. The biomembrane as a liquid crystalline system  
A. G. Petrov  
Fifth Winter School Biophysics, Membrane Transport, Poland (1979).  
School Proceedings vol. 1, p. 297.
27. Edge energy and pore stability in membranes - molecular description  
M. D. Mitov, A. G. Petrov, A. Derzhanski  
*ibidem*, vol. 2, p. 313.
28. Electric field induced pores in erythrocyte membranes - a discussion  
A. Derzhanski, A. G. Petrov, M. D. Mitov  
*ibidem*, vol. 2, p. 285.
29. A new interpretation of the experiments on osmotic pressure induced pores in phospholipid vesicles  
M. D. Mitov, A. G. Petrov  
Proc. Colloques nationaux du C.N.R.S. No 938 - Physicochimie des composés amphiphiles, p. 249 (1979).
30. Dynamics of the Freedericksz transition in the electric field in non-ideally oriented nematic layers at subthreshold and above threshold voltages  
N. Aneva, A. G. Petrov, S. Sokerov, S. Stoylov  
*Mol. Cryst. Liq. Cryst.* **60**, 1 (1980).
31. Stabilization of foam films of nonionic detergents by liquid crystals  
A. G. Petrov, S. Naydenova  
*J. Disp. Sci. Technol.* **1**, 283 (1980).
32. Molecular asymmetry, flexoelectricity and elasticity of nematics  
A. Derzhanski, A. G. Petrov, I. Bivas  
*Advances in Liq. Cryst. Res. and Appl.*, Ed. L. Bata, Pergamon Press, Oxford - Akad. Kiado, Budapest, vol. 1, p. 505 (1980).
33. Gradient flexoelectric effect and longitudinal domains in nematics  
A. Derzhanski, A. G. Petrov  
*Advances in Liq. Cryst. Res. and Appl.*, Ed. L. Bata, Pergamon Press, Oxford - Akad. Kiado, Budapest, vol. 1, p. 515 (1980).
34. Edge energy and pore stability in bilayer lipid membranes  
A. G. Petrov, M. D. Mitov, A. Derzhanski  
*Advances in Liq. Cryst. Res. and Appl.*, Ed. L. Bata, Pergamon Press, Oxford - Akad. Kiado, Budapest, vol. 2, p. 695 (1980).
35. Generation of low frequency electrical and optical oscillations in a system liquid crystal cell-solar cell  
L. K. Vistin', A. G. Petrov, N. T. Shonova, A. Derzhanski  
*Advances in Liq. Cryst. Res. and Appl.*, Ed. L. Bata, Pergamon Press, Oxford - Akad. Kiado, Budapest, vol.2, p. 1213 (1980).
36. Curvature induced conductive and displacement currents through lipid bilayers  
A. Derzhanski, A. G. Petrov, Y. V. Pavloff  
*J. Physique Lett.* **42**, L-119 (1981).
37. Flexoelectric and steric interactions between two lipid bilayer membranes resulting from their curvature fluctuations

- I. Bivas, A. G. Petrov  
*J. theor. Biol.* **88**, 459-483 (1981).
38. The problem of self-assembly of lipids and proteins into liquid crystalline membrane structures  
 A. G. Petrov  
*Sixth School Biophys. Membrane Transport, Poland* (1981). *School Proceedings*, vol. 1, p. 116.
39. On the theory of domain formation in mixed lipid systems  
 A. G. Petrov, H. Frischleder  
*Chem. Phys. Lipids*, **29**, 165 (1981).
40. The observation of hydrodynamic instability in a cholesteric liquid crystal having a free surface  
 I. I. Gorina, N. L. Sizova, I. G. Chistyakov, A. G. Petrov, A. Derzhanski  
*Mol. Cryst. Liq. Cryst.* **66**, 159 (1981).
41. Hydrodynamic instability of cholesterics under local heating conditions (in Russian)  
 I. Chistyakov, I. Gorima, N. Sizova, A. Petrov, A. Derzhanski  
*Zhidkie kristali, Inter-university Collection. of Scientific Papers, Ivanovo State Univ.*, 1981, p. 44.
42. Optical detection of phase transitions in simple and mixed lipid-water systems  
 A. G. Petrov, K. Gawrisch, G. Brezesinski, G. Klose, A. Möps  
*Biochim. Biophys. Acta* **690**, 1 (1982).
43. Defects in lipid bilayers and their influence on membrane fusion  
 A. G. Petrov, M. D. Mitov  
*studia biophysica* **90**, 223 (1982).
44. Self-assembly and phase behaviour of short chain phosphonic acid-water systems in a wide concentration range. Microscopic, NMR and X-ray diffraction studies  
 G. Klose, A. G. Petrov, F. Volke, H. W. Meyer, G. Förster, W. Rettig  
*Mol. Cryst. Liq. Cryst.* **88**, 109 (1982).
45. Multipole model of the molecular asymmetry in thermotropic and lyotropic liquid crystals. Volume and surface effects  
 A. Derzhanski, A. G. Petrov  
*Mol. Cryst. Liq. Cryst.* **89**, 339 (1982).
46. Optical method for determination of anchoring energy of tilted nematic layers  
 L. Komitov, A. G. Petrov  
*phys. stat. sol.(a)* **76**, 137 (1983).
47. Order parameter and molecular polarizabilities of liquid crystals with nematic and smectic phases  
 A. Hauser, G. Pelzl, C. Selbmann, D. Demus, S. Grande, A. Petrov  
*Mol. Cryst. Liq. Cryst.* **91**, 97 (1983).
48. Bestimmung der Phasenübergangstemperaturen lyotroper flüssig-crystalliner Systeme mittels Microscopie im polarisierten Licht  
 K. Gawrisch, M. D. Mitov, A. Möps, A. G. Petrov  
*Wiss. Ber. Karl-Marx-Universität Leipzig*, **32**, 80 (1983).
49. Optical, DSC and <sup>31</sup>P-NMR investigations of phase separation in phosphatidylcholine/phosphatidylethanolamine mixtures  
 K. Gawrisch, K. Arnold, A. G. Petrov, G. Brezesinski, A. Möps, A. Lösche, G. Klose

- studies biophysica, **90**, 131 (1982).
50. Quasihomotropic, reversely pretilted hematic liquid crystal layers. Electrooptical behaviour.  
L. Komitov, A. G. Petrov  
phys. stat. sol. (a) **79**, 623 (1983).
  51. A novel polar electrooptic effect in reversely pretilted nematic liquid crystal layers with weak anchoring  
L. Komitov, A. G. Petrov  
Japan Display '83: Proc. 3rd Int. Display Res. Conf. (Kobe, 1983) p. 482.
  52. The biological membrane as a liquid crystalline system in the cryoconcentration process (in Bulgarian)  
A. Derzhanski, A. G. Petrov, M. D. Mitov, A. Kolinkoeva  
in: Cryobiology of Sex Cells, Ed. K. Bratanov, Bulg. Acad. Sci. Publ. House, Sofia 1983, pp 12 - 35.
  53. Elasticity of layered lyotropic mesophases (in Russian)  
A. G. Petrov, A. Derzhanski  
Mendeleev J. All Union Chem. Soc. (Moscow) **28**, 197 (1983)
  54. Short and long-range interactions of proteins and mesomorphic lipids within biological membranes  
S. A. Seleznev, A. G. Petrov  
Compt. rend. Acad. bulg. Sci. **36**, 615-618 (1983)
  55. Thermal instability in lamellar phases of lecithin: a planar undulation model  
A. G. Petrov, G. Durand  
J. Physique-Lett. **44**, L-793 (1983).
  56. Flexoelectricity of lyotropics and biomembranes  
A. G. Petrov  
Nuovo Cimento **3D**, 174 (1984).
  57. Curvature elasticity and passage formation in lipid bilayers. Lattice of passages  
A. G. Petrov, M. M. Kozlov  
Compt. rend. Acad. bulg. Sci. **37**, 1191 (1984).
  58. Electromechanical mechanism of pore formation in bilayer lipid membranes  
V. F. Pastushenko, A. G. Petrov  
Seventh School Biophys. Membrane Transport, Poland 1984, School Proceedings, vol. II, pp 69-91 (Wroclaw, 1984).
  59. Elastic and flexoelectric aspects of out-of-plane fluctuations in biological and model membranes  
A. G. Petrov, I. Bivas  
Progress in Surface Sci., Ed. S. Davison, **16**, 389-512 (1984)
  60. Electrical and thermal instabilities in aqueous and nonaqueous lamellar mesophases of lecithin (in Russian)  
A. G. Petrov, S. P. Chumakova, S. B. Naydenova  
Kristallografia (Moscow) **29**, 1138 (1984).
  61. Influence of finite sample thickness and distortion on the critical angle of total reflection  
K. Eidner, G. Mayer, R. Schuster, L. Komitov, A. G. Petrov  
phys. stat. sol. (a) **90**, 349 (1985).
  62. Curvature-electric effect in black lipid membranes

- A. G. Petrov, V. S. Sokolov  
Eur. Biophys. J. **13**, 139 (1986).
63. Is flexoelectricity the coupling factor between chemical energy and osmotic work in the pump? A model of pump  
A. G. Petrov, L. Mircevova  
Gen. Physiol. Biophys. **5**, 391 (1986).
64. Future development of the multipole model of molecular asymmetry in thermotropics and lyotropics. Dependence of the generalized multipoles on the generalized fields  
A. Derzhanski, A. G. Petrov, M. D. Mitov  
Wiss. Beiträge MLU Halle **52**, 170 (1986).
65. Molecular physics and biophysical aspects of lyotropic liquid crystal state of matter (in Bulgarian)  
A. G. Petrov  
D.Sc. Thesis, Inst Solid State Physics, Bulg Acad Sci, Sofia (1986), 507 pp.
66. Generalized asymmetry of thermotropic and lyotropic mesogens  
A. G. Petrov, A. Derzhanski  
Mol. Cryst. Liq. Cryst. **151**, 303 (1987).
67. Thermal and mechanical instabilities in nonaqueous lamellar lyotropic lecithin - ethylenglycol  
A. G. Petrov, M. Cagnon, Y. Galerne, G. Durand  
Mol. Cryst. Liq. Cryst. **154**, 179 (1988).
68. Theory of refractivity of lyotropic nematics  
M.A.Osipov, A.G.Petrov  
Kolloid. Zh. **50**, 1130 (1988); Colloid J. **50**, 969 (1988)
69. Demonstration of ferroelectricity in a lyotropic liquid crystal with chiral additive (in Russian)  
L.M.Blinov, S.A.Davidyan, A.G.Petrov, A.T.Todorov, S.V.Yablonsky  
Pisma v ZhETF **48**, 259 (1988)
70. Generalized lipid asymmetry and instability phenomena in membranes  
A. G. Petrov  
Ninth School Biophys. Membrane Transport, Poland 1988. School Proceedings, vol. II, p. 67-86 (Wroclaw, 1988).
71. Curvature-electric effects in artificial and natural membranes studied using patch-clamp techniques  
A. G. Petrov, R. L. Ramsey, P. N. R. Usherwood  
Eur. Biophys. J. **17**, 13-17 (1989).
72. Molecular polarizabilities in N (p-n-alkoxy benzylidene) p-n-alkyl anilines  
N. V. S. Rao, V. G. K. M. Pisipati, P. V. Datta Prasad, P. R. Alapati, D. M. Potukuchi, A. G. Petrov  
Bulg. J. Phys. **16**, 93-104 (1989).
73. Piezoelectric effect in smectic C\* and smectic F\*  
B. Boney, V. G. K. M. Pisipati, A. G. Petrov  
Liquid Crystals **6**, 133-136 (1989)
74. Flexoelectricity of layered and columnar lyotropic phases  
A. Derzhanski, A. G. Petrov, A. Todorov  
Bulg. J. Phys. **16**, 268-279 (1989).

75. On the problem of pattern preservation in lipid monolayers during transfer on solid supports  
P. Karg, A.G.Petrov, E.Sackmann, A.Wunderlich  
*J. Molecular Electronics* **6**, 21-29 (1990).
76. Flexoelectricity of lipid bilayers  
A.Derzhanski, A.G.Petrov, A.T.Todorov, K.Hristova  
*Liquid Crystals* **7**, 439-449 (1990).
77. Pure and mixed lipid black foam films as models of membrane fusion  
S.Naydenova, Z.Lalchev, A.G.Petrov, D.Exerowa  
*Eur. Biophys. J.* **17**, 343-347 (1990).
78. Manifestations of ferroelectricity in lyotropics with chiral additives: Biomembranes' analogs  
A.G.Petrov, A.T.Todorov, B.Bonev, L.M.Blinov, S.V.Yablonski, D.B.Subachyus, N.Tsvetkova  
*Ferroelectrics* **114**, 415-427 (1991).
79. On the use of black lipid membranes as pressure sensors  
S.Naydenova, K.Hristova, A.Todorov, A.G.Petrov  
2nd Int. Conference "Molecular Electronics and Biocomputers", Moscow (1989), Abstracts pp 91-92.
80. New highly precise and well defined Langmuir-Blodgett film deposition system  
G.R.Ivanov, A.T.Todorov, A.G.Petrov  
in: *Molecular Electronics*, P.I.Lazarev (ed.) Kluwer Acad. Publ., Netherlands (1991), pp. 139-144.
81. Langmuir trough with enhanced performance  
G.R.Ivanov, A.T.Todorov, A.G.Petrov  
*Makromol.Chem., Makromol.Symp.* **46**, 377-381 (1991).
82. Influence of the electric double layers of the membrane on the value of its flexoelectric coefficient  
K.Hristova, I.Bivas, A.G.Petrov, A.Derzhanski  
*Mol.Cryst.Liq.Cryst.* **200**, 71-77 (1991).
83. Modelling mechanosensitivity in membranes: effects of lateral tension on ionic pores in a microcystin toxin-containing membrane  
A.G.Petrov, R.L.Ramsey, G.A.Codd, P.N.R.Usherwood  
*Eur. Biophys. J.* **20**, 17-29 (1991).
84. Electrical and real-time stroboscopic interferometric measurements of bilayer lipid membrane flexoelectricity  
A.T.Todorov, A.G.Petrov, M.O.Brandt, J.H.Fendler  
*Langmuir* **7**, 3127-3137 (1991).
85. Mechanoelectricity of guest-host membrane systems: lipid bilayer containing ion channels  
A.G.Petrov, B.A.Miller, P.N.R.Usherwood  
*Mol.Cryst.Liq.Cryst.* **215**, 109-119 (1992).
86. Polymorphism in Langmuir films from a fluorescently marked phospholipid  
G.R.Ivanov, A.G.Petrov  
*Mol.Cryst.Liq.Cryst.* **215**, 245-252 (1992).
87. The electrooptics of smectic C liquid crystals  
M.P.Petrov, A.G.Petrov, G.Pelzl



- Liquid Crystals **11**, 865-886 (1992)
88. Aspects of Langmuir-Blodgett trough design: computerisation, surface pressure measurement, unevenness of motion, generated vibrations  
G.R.Ivanov, G.Kostadinov, A.G.Petrov  
Thin Solid Films **210/211**, 13-15 (1992).
  89. Flexoelectricity of membranes and electric double layers  
A.G.Petrov  
In: Colloid and Molecular Electrooptics 1991, Ed. by B.R.Jennings and S.P.Stoylov, Institute of Physics Publ., Bristol and Philadelphia (1992) pp. 171-176.
  90. Nodularin, a cyclic pentameric peptide, forms ion channels in lipid bilayers  
I.R.Mellor, G.A.Codd, P.N.R.Usherwood, A.G.Petrov  
C.R.Acad.bulg.Sci. **46**, No 5, 53-55 (1993)
  91. Temperature-driven anchoring transition in nematic liquid crystals interacting with Langmuir-Blodgett films  
N.Shonova, J.I.Petkova, A.G.Petrov  
C.R.Acad.bulg.Sci. **46**, No 5, 45-48 (1993)
  92. Flexoelectric effects in model and native membranes containing ion channels  
A.G.Petrov, B.A.Miller, K.Hristova, P.N.R.Usherwood  
Eur.Biophys.J. **22**, 289-300 (1993)
  93. Gradient flexoelectric effect and thickness dependence of anchoring energy  
A.L.Alexe-Ionescu, G.Barbero, A.G.Petrov  
Phys Rev.E **48**, R1631-R1634 (1993)
  94. DNA interaction with lipid bilayer  
M.Spasoova, A.G.Petrov, I.Tsoneva, E.Neumann  
C.R.Acad.bulg.Sci. **46**, No 12, 33-36 (1993)
  95. Mechanosensitivity of cell membranes. Ion channels, lipid matrix and cytoskeleton (Invited review)  
A.G.Petrov, P.N.R.Usherwood  
Eur.Biophys.J. **23**, 1-19 (1994)
  96. Nematic liquid crystal anchoring on Langmuir-Blodgett films: steric, biphilic, dielectric and flexoelectric aspects and instabilities  
G. Barbero, A.G.Petrov  
J.Phys.: Condens. Matter **6**, 2291-2306 (1994)
  97. First observation of the converse flexoelectric effect in bilayer lipid membranes  
A.Todorov, A.G.Petrov, J.H.Fendler  
J.Phys.Chem. **98**, 3076-3079 (1994)
  98. Flexoelectricity of charged and dipolar bilayer lipid membranes studied by stroboscopic interferometry  
A.Todorov, A.G.Petrov, J.H.Fendler  
Langmuir **10**, 2344-2350 (1994)
  99. Electric field transport of biphilic ions and anchoring transitions in nematic liquid crystals  
A.G.Petrov, G.Durand  
Liquid Crystals **17**, 543-554 (1994)
  100. Dip patch clamp currents suggest electrodiffusive transport of the polyelectrolyte DNA through lipid bilayers  
M.Spasoova, I.Tsoneva, A.G.Petrov, J.I.Petkova, E.Neumann

- Biophys.Chem. **52**, 267-274 (1994)
101. Pores formed in lipid bilayers and in native membranes by nodularin, a cyanobacterial toxin  
M.Spasoova, I.R.Mellor, A.G.Petrov, K.A.Beattie, G.A.Codd, H.Vais, P.N.R.Usherwood  
Eur.Biophys.J. **24**, 69-76 (1995)
  102. Photoflexoelectric effects in bilayer lipid membranes  
M.Spasoova, A.G.Petrov, J.H.Fendler  
J.Phys.Chem. **99**, 9485-9490 (1995)
  103. Investigation of flexoelectric properties of a palladium-containing nematic liquid crystal, Azpac, and its mixtures with MBBA  
A.G.Petrov, A.Th. Ionescu, C.Versache, N.Scaramuzza  
Liquid Crystals **19**, 169-178 (1995)
  104. Aggregation-assisted induced electric order in the nematic phase of a metallorganic complex  
A.Th.Ionescu, D.Pucci, N.Scaramuzza, C.Versace, A.G.Petrov, R.Bartolino  
J.Chem.Phys. **103**, 5144-5148 (1995)
  105. Self-assembled multilayers of stearic acid: Fourier transform infrared spectroscopic study  
S.Naydenova, A G Petrov, J Yarwood  
Compt. rend. Acad. bulg. Sci. **48**, No 9-10, 27-30 (1995)
  106. An FTIR-ATR study of the incorporation of the peptide Gramicidin-D into DPPA self-assembled multilayers  
S.Naydenova, A.G.Petrov, J.Yarwood  
Langmuir **11**, 3435-3437 (1995)
  107. Flexoelectricity and photoflexoelectricity in model and biomembranes  
A.G.Petrov, M.Spasoova, J.H.Fendler  
Thin Solid Films **284-285**, 845-848 (1996)
  108. Mechanical, electrical and photoelectrical energy interconversion in nanomembranes  
A.G.Petrov, M.Spasoova, J.H.Fendler  
Proc. NATO Adv. Res. Workshop "Nanoparticles in Solids and Solutions", Eds. J.Fendler and I.Dekany, Kluwer Academic Publs., Netherlands (1996) pp. 175 - 183.
  109. Novel photoflexoelectric membranes  
A.G.Petrov  
Europhys.News **27**, 92 (1996)
  110. Charge transfer processes in model and biological membranes: Defect and mechano-electric aspects; statics and dynamics  
A.G.Petrov  
Mol.Cryst.Liq.Cryst.A **292**, 227-234 (1997)
  111. Investigations of peptide-modified lipid layers on solid supports by impedance spectroscopy  
Y.G.Marinov, A.G.Petrov and J.Yarwood  
Mol. Materials **9**, 43-52 (1997)
  112. Philantotoxin-343 and spermine form ion pores in lipid bilayers  
M.Spasoova, I.R.Mellor, A.G.Petrov and P.N.R.Usherwood

- Compt. rend. Acad. bulg. Sci. **51**, No 1-2, 41-44 (1998)
113. Flexoelectricity and ion channels: a confirmation of the flexoelectric model for ion transport.  
A. G. Petrov  
Cell.& Molec.Biol.Lett. **2**, suppl. 1, 231-253 (1997)
114. Surface polarization of boundary layers of nematic liquid crystals and its influence on magneto-structural transitions  
H. Schmiedel, A.G.Petrov  
Mol. Materials **9**, 193-203 (1998).
115. Photoflexoelectric effects in a homeotropic guest-host nematic  
Y.Marinov, N.Shonova, L.M.Blinov and A.G. Petrov  
Europhys.Lett. **41**, 513-518 (1998)
116. Mechanosensitive potassium channels in locust muscle membrane  
I.R. Mellor, B.A. Miller, A.G. Petrov, I. Tabarean, P.N.R. Usherwood  
Eur. Biophys. J. **28**, 346-350 (1999)
117. Measurements of anchoring energy of a nematic liquid crystal, 4-cyano-4'-n-pentylbiphenyl on Langmuir-Blodgett films of dipalmitoyl phosphatidylcholine  
U. Kühnau, A.G. Petrov, G.Klose, H. Schmiedel  
Phys. Rev. E, **59**, 578-585 (1999)
118. Liquid crystal physics and the physics of living matter  
A.G.Petrov  
Mol.Cryst.Liq.Cryst. **332**, 577-584 (1999)
119. Flexoelectric spectroscopy measurements of surface dissipation of energy and surface viscosity of weakly anchored homeotropic nematics  
Y.Marinov, N.Shonova, C.Versace, A.G.Petrov  
Mol.Cryst.Liq.Cryst. **329**, 533-538 (1999)
120. Polar surface interactions vs. long range interactions in the problem of nematic anchoring  
A.G.Petrov, H.Schmiedel, U. Kühnau  
Mol.Cryst.Liq.Cryst. **329**, 349-356 (1999)
121. Interaction of phospholipid bilayers with polyamines of different length  
A. Zheliaskova, S. Naydenova and A. G. Petrov  
Eur. Biophys. J., **29**, 153-157 (2000)
122. Surface dissipation of energy in homeotropic nematic layers, weakly anchored on various self-assembled substrates  
Y. Marinov, N.Shonova, S. Naydenova, A.G.Petrov  
Mol.Cryst.Liq.Cryst. **351**, 411- 417 (2000)
123. Photoconductance Effects in Bilayer Lipid Membranes, Containing Amphiphilic Hexadecylbenzospirane Derivative  
A. Zheliaskova, I. Peeva, K. Balashev, I. Panaiotov, A.G. Petrov  
Mol.Cryst.Liq.Cryst. **352**, 37- 44 (2000)
124. Measurements and interpretation of flexoelectricity (Invited review)  
A.G.Petrov  
Physical Properties of Liquid Crystals, EMIS Datareviews Series, Inst. Electrical Engineers, UK, vol. **25**, 251-264 (2001)
125. Flexoelectricity of Wedge-Like Molecules in Nematic Mixtures  
Y. Marinov, J. Kosmopoulos, W. Weissflog, A.G. Petrov, D.J. Photinos

- Mol. Cryst. Liq. Cryst. **357**, 221-228 (2001)
126. Whole-cell patch-clamp study of heavy metal ion ( $\text{Cd}^{2+}$ ) influence of ionic currents in TE671 cells  
A. Zheliaskova, I. Mellor, A. G. Petrov, P. N. R. Usherwood  
Compt.rend.Acad.bulg.Sci. **54**, No 4, 25-28 (2001)
127. A new generation of surface-driven liquid crystal displays  
A.G.Petrov  
Materials for Information Technology in the New Millenium, Eds. J.M.Marshall et al., Bookcraft, Bath (2001) pp. 74-81.
128. Detection of heavy metal ions ( $\text{Cd}^{2+}$  and  $\text{Hg}^{2+}$ ) by their influence on flexoelectricity of patch clamped membranes  
A.Zheliaskova, S.Naidenova, Y.Marinov, I.R.Mellor, P.N.R.Usherwood, A.G.Petrov  
Compt. Rend. Acad. bulg. Sci. **54**, No12, 53-56 (2001)
129. Flexoelectricity and elasticity of asymmetric biomembranes  
A.G. Petrov, F. Sachs  
Phys. Rev. E **65**, 021905-10 (2002)
130. Flexoelectricity of model and living membranes  
A.G. Petrov  
Biochim. Biophys. Acta - Review on Biomembranes **1561**, 1-25 (2002)
131. Lipid-mediated action of local anesthetics on ion channels in membranes  
Y. Suezaki, A. G. Petrov  
J. Phys. Soc. Japan **71**, 1208-1209 (2002)
132. Effect of heavy metal ions on lipid bilayers containing gramicidin channels  
S.Naidenova, I.R.Mellor, A.G.Petrov  
Compt. Rend. Acad. bulg. Sci. **56**, No 3, 63-68 (2003)
133. Ion-channel containing lipid membranes interacting with heavy metal ions  
S. Naydenova, A. Zheliaskova, R. Ugrinov, Y. Marinov, A.G.Petrov  
J.Mat.Sci.: Mat. Electronics **14**, 815-816 (2003)
134. Evidence of flexoelectricity in polymer-dispersed liquid crystals  
L.Todorova, T.Angelov, Y. Marinov, A.G. Petrov  
J.Mat.Sci.: Mat. Electronics **14**, 817-818 (2003)
135. Mechanoelectric properties of BLMs  
A. G. Petrov  
Chapter 6 in: Planar Lipid Bilayers (BLMs) and their Applications. Eds. HT Tien and A. Ottova, Elsevier Science, Amsterdam- NY, 2003, pp. 205-238.
136. Present state of the generalized molecular asymmetry model in liquid crystal physics  
A. G. Petrov  
Bulg. J. Phys. **31**, 1-27 (2004)
137. Wedge-like asymmetry contribution to flexoelectricity in nematic mixtures  
Y.Marinov, S.Naydenova, A.G.Petrov  
Bulg. J. Phys. **31**, 28-32 (2004)
138. Flexoelectric study of cyanobiphenyl liquid crystals dispersed in various polymer matrices  
L.Todorova, S.Naydenova, T.Angelov, Y.Marinov, A.G.Petrov  
Bulg. J. Phys. **31**, 39-48 (2004)

139. Surface dissipation in homeotropic nematic layers characterized by orientant desorption  
L.Todorova, Y.Marinov, I. Maslyanitsyn, S. Torgova, A.G.Petrov  
Bulg. J. Phys. **31**, 49-54 (2004)
140. Characterization of micron and submicron scale lateral structure of optically nonlinear organic films,  
I. A. Maslyanitsyn, V. D. Shigorin, L. Todorova, Y. Marinov, A. G. Petrov  
Mol. Cryst. Liq. Cryst., **408**, 71 - 81 (2004).
141. Surface energy dissipation in homeotropic nematic layers: the role of flexoelectricity and surfactant desorption  
S.Ponti, G.Barbero, A.Strigazzi, Y.Marinov, A.G.Petrov  
Mol.Cryst.Liq.Cryst. **420**, 55-72 (2004)
142. Investigation of Bragg gratings recorded in polymer-dispersed liquid crystals  
K.Beev, S.Sainov, T.Angelov, A.G.Petrov  
J.Optoelec.Adv.Mat. **6**, 799-803 (2004)
143. Interaction of Cd<sup>2+</sup> ions with bilayer lipid membranes  
S. Naydenova, M. Dencheva-Zarkova, R. Ugrinov, A. G. Petrov  
Nanoscience&Nanotechnology, **4**, 192-194 (2004)
144. Longitudinal flexoelectric domains in BMAOB nematic layers under joint action of dc and ac voltages,  
Y. Marinov, H. P. Hinov, and A. G. Petrov  
J.Optoelec.Adv. Mat. **7**, 277-280 (2005)
145. Surfactant desorption in homeotropic nematic layers studied by flexoelectric spectroscopy  
L. Todorova, Y. Marinov, I. Maslyanitsyn, S. Torgova and A.G. Petrov  
J.Optoelec.Adv. Mat. **7**, 269-272 (2005)
146. Temperature dependence of chromaticity in polymer-dispersed cholesteric liquid crystal: reflection and transmission characteristics  
P. Pavlova, L. Avramov, H. Naradikian, T. Angelov, and A.G. Petrov,  
J.Optoelec.Adv. Mat. **7**, 285-288 (2005)
147. Investigation of Bragg gratings recorded in polymer-dispersed liquid crystals  
K.Beev, S.Sainov, T.Angelov, A.G.Petrov  
J.Optoelec.Adv. Mat **6** (3), 799-803 (2004)
148. Holographic recording in polymer-dispersed liquid crystals  
K.Beev, S.Sainov, T.Angelov, A.G.Petrov  
Proc. SPIE **5830**, 90-94 (2005)
149. On a simple way for obtaining important material constants of a nematic liquid crystal: longitudinal flexoelectric domains under the joint action of dc and ac voltages  
Y.Marinov, A.G.Petrov, H.P.Hinov,  
Mol.Cryst.Liq.Cryst., **449**, 33-45 (2006)
150. Electricity and mechanics of biomembrane systems: Flexoelectricity in living membranes (Invited Review)  
Alexander G. Petrov  
Anal.Chim.Acta, **568**, 70-83 (2006)
151. Photoisomerization effects of an azobenzene derivative on bilayer lipid membranes and living cells

- S. Naydenova, M. Dencheva-Zarkova, L. Todorova, A. G. Petrov  
C.R.Acad.bulg.Sci, **59**, 4, 405-410 (2006)
152. Characterization of magnetic nanoparticles and their organization in magnetic fields  
L.Slavov, T.Merodiiska, L.Todorova, M.Dencheva-Zarkova, S.Naydenova, V.Lovchinov, I.Nedkov, A.G.Petrov  
Nanoscience & Nanotechnology, **6**, Heron Press, pp.46-48, 2006
153. Orientation effects of PTFE nanolayers upon the nematic 5CB  
Y. Marinov, S. D'Elia, L. Todorova, A. G. Petrov, C. Versace, N. Scaramuzza  
Liquid Crystals **33**, 1219-1225 (2006)
154. Flexoelectricity and mechanotransduction (Invited Review)  
Alexander G. Petrov  
In: Current Topics in Membranes, vol. 58: Mechanosensitive channels, O.P.Hamil, Ed., Elsevier/Academic Press (2007), pp. 121-150.
155. Controllable-gradient microscale PDLC electro-optical materials formed by nanosecond laser photopolymerization  
Y. Marinov, G. B. Hadjichristov, A. G. Petrov  
J.Optoelec.Adv. Mat. **9**, 417 – 419 (2007)
156. Dielectric and flexoelectric oscillations in PDLC studied by flexoelectric spectroscopy and laser light diffraction  
A. G. Petrov, Y. Marinov, S. D'Elia, S. Marino, C. Versace, N. Scaramuzza  
J.Optoelec.Adv. Mat. **9**, 420 – 423 (2007)
157. Hydrophobic magnetic nanoparticles: synthesis and LB film preparation  
T. Angelov, D. Radev, G. Ivanov, D. Antonov, A.G. Petrov  
J.Optoelec.Adv. Mat. **9**, 424 - 426 (2007)
158. Pretilted nematic layers of 5CB on PTFE treated glass supports  
S. D'Elia, C. Versace, N. Scaramuzza, Y. Marinov, A. G. Petrov,  
Mol. Cryst. Liq. Cryst. **465**, 301-308 (2007)
159. Magnetic resonance imaging by specially formulated iron oxide nanoparticles  
R.Kalionski, T.Merodiiska, M.Dencheva-Zarkova, L.Todorova, S.Naydenova, V.Lovchinov, Z.Lalchev, I.Nedkov, A.G.Petrov  
C.R. Acad. Bulg. Sci. **60**, No8, 893-898 (2007)
160. Flexoelectricity: a universal sensoric mechanism in biomembranes and in chem.-biosensors  
A.G.Petrov  
In: Functionalized Nanoscale Materials, Devices and Systems, A.Vaseashta and I.N.Mihailescu Eds., Springer (2008), pp.87-100.
161. Soft matter biosensors: stochastic and deterministic membrane sensing  
Alexander G. Petrov, and Stanimira Naydenova  
J. Indian Inst. Sci. **89**, 195-209 (2009)
162. Chirality of lipids makes fluid lamellar phases piezoelectric,  
John Harden, Nicholas Diorio, Alexander G. Petrov, Antal Jakli,  
Phys Rev E **79**, 011701 (2009)
163. Converse Flexoelectric Effect in Bent-Core Nematic Liquid Crystals  
Pramoda Kumar, Y. G. Marinov, H. P. Hinov, Uma S. Hiremath,  
C. V. Yelamaggad, K. S. Krishnamurthy, and A. G. Petrov  
J. Phys. Chem. B **113**, 9168–9174 (2009)

164. Membrane Electromechanics in Biology, with a Focus on Hearing  
F. Sachs, W.E. Brownell, and A.G. Petrov  
MRS Bulletin **34**, 665-670 (2009)
165. Linear size gradient single layers of polymer-dispersed liquid crystal micrometer-sized droplets for diffractive optics  
Georgi B. Hadjichristov, Yordan G. Marinov, Alexander G. Petrov  
Optical Materials **31**, 1578–1585 (2009)
166. Single-layered microscale linear-gradient PDLC material for electro-optics  
Y. G. Marinov, G. B. Hadjichristov, and A. G. Petrov  
Cryst. Res. Technol. **44**, No. 8, 870 – 878 (2009)
167. Gradient microscale PDLC single layers for light control.  
Y.Marinov, G.B.Hadjichristov, A.G.Petrov,  
JOAM **11**, 1186 - 1189 (2009)
168. Optical interference effects in microscale PDLC two-dimensional layers.  
G.B.Hadjichristov, Y.Marinov, A.G.Petrov,  
JOAM **11**, 1190 - 1193 (2009)
169. Observations of flexo-dielectric walls in bent-core-calamitic nematic liquid crystal.  
H.P.Hinov, Y.G.Marinov, A.G.Petrov, U.S.Hiremath, C.V.Yelamaggad,  
JOAM **11**, 1194 – 1197 (2009)
170. Single-Layered PDLC for Diffractive Optics  
Georgi B. Hadjichristov, Yordan G. Marinov, Alexander G. Petrov  
Mol. Cryst. Liq. Cryst., **525**, 148–159 (2010)
171. Single-layered PDLC films for electrically variable laser light reflection application  
Yordan G. Marinov, Georgi B. Hadjichristov, Alexander G. Petrov  
Optics Lasers Eng. **48**, 1161–1165 (2010)
172. Influence of single-walled carbon nanotubes and/or zwitter-ionic phospholipid (SOPC) surface layer on the behaviour of the gradient flexoelectric and surface induced polarization domains arising in a homeotropic E7 nematic layer  
H P Hinov, J I Pavlič, Y G Marinov, A G Petrov, S Sridevi, P M Rafailov, U Dettlaff-Weglikowska  
J. Phys.: Conf. Ser. **253**, 012061 (2010).
173. Conoscopic evidence of the UV light-induced flexoelectric effect in homeotropic layers of nematic liquid crystal doped with azobenzene derivatives  
Y G Marinov, G B Hadjichristov, A G Petrov, S Sridevi, U S Hiremath, C V Yelamaggad and S K Prasad  
J. Phys.: Conf. Ser. **253**, 012060 (2010).
174. Observation of Flexoelectricity in Mixtures of Calamitic and Bent-Core Liquid Crystals  
Y.G.Marinov, H.P.Hinov, G.B.Hadjichristov, A.G.Petrov, Uma S.Hiremath, C.V. Yelamaggad,  
7th Int. Conf. Balkan Physical Union. AIP Conf. Proc., **1203**, 329-334 (2010)
175. New Photoactive Guest-Host Nematics Showing Photoflexoelectricity  
Alexander G.Petrov, Y. G. Marinov, G.B.Hadjichristov, S. Sridevi, Uma S. Hiremath, C.V. Yelamaggad, and S. Krishna Prasad

- Mol.Cryst.Liq.Cryst. (in press).
176. Observation of Flexoelectricity in a Mixture of Carbon Single Walled Nanotubes with a Nematic Liquid Crystal  
A.G. Petrov, Y. G. Marinov, H. P. Hinov, L. Todorova, M. Dencheva-Zarkova, S. Sridevi, P. M. Rafailov, U. Dettlaff-Weglikowska  
Mol.Cryst.Liq.Cryst. (in press).
177. Gradient polymer-disposed liquid crystal single layer of large nematic droplets for modulation of laser light  
Georgi B. Hadjichristov, Yordan G. Marinov, and Alexander G. Petrov,  
Appl. Opt. **50**, 2326-2333 (2011)