

# Acceleration of diffusion in ethylammonium nitrate ionic liquid confined between parallel glass plates

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## Abstract

© the Owner Societies 2017. Diffusion of EAN confined between polar glass plates separated by a few micrometers is higher by a factor of ca. 2 as compared to bulk values. Formation of a new phase, different to the bulk, was suggested.

<http://dx.doi.org/10.1039/c7cp01772c>

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## References

- [1] T. L. Greaves C. J. Drummond *Chem. Rev.* 2008 108 206
- [2] R. D. Rogers K. R. Seddon *Science* 2003 302 792
- [3] C. Zhao G. T. Burrell A. A. J. Torriero F. Separovic N. F. Dunlop D. R. MacFarlane A. M. Bond *J. Phys. Chem. B* 2008 113 6923
- [4] M. Lazzari M. Mastragostino F. Soavi *Electrochem. Commun.* 2007 9 1567
- [5] J. A. Garlitz C. A. Summers R. A. Flowers II G. E. O. Borgstahl *Acta Crystallogr., Sect. D: Biol. Crystallogr.* 1999 55 2037
- [6] F. U. Shah S. Glavatskih O. N. Antzutkin *Tribol. Lett.* 2013 51 281
- [7] P. Walden *Bull. Acad. Imp. Sci. St.-Petersbourg* 1914 8 405
- [8] H. J. Jiang P. A. FitzGerald A. Dolan R. Atkin G. G. Warr *J. Phys. Chem. B* 2014 118 9983
- [9] R. Atkin G. G. Warr *J. Phys. Chem. B* 2008 112 4164
- [10] R. Atkin G. G. Warr *J. Phys. Chem. C* 2007 111 5162
- [11] P. Niga D. Wakeham A. Nelson G. G. Warr M. Rutland R. Atkin *Langmuir* 2010 26 8282
- [12] E. Sloutskin B. M. Ocko L. Tamam I. Kuzmenko T. Gog M. Deutsch *J. Am. Chem. Soc.* 2005 21 7796
- [13] S. Bovio A. Podesta C. Lenardi P. Milani *J. Phys. Chem. B* 2009 113 6600
- [14] L. A. Jurado H. Kim A. Arcifa A. Rossi C. Leal N. D. Spencer R. M. Espinosa-Marzal *Phys. Chem. Chem. Phys.* 2015 17 13613
- [15] R. S. Anareddy S. K. Shaw *Langmuir* 2016 24 5147
- [16] M. Taher F. U. Shah A. Filippov P. de Baets S. Glavatskih O. N. Antzutkin *RSC Adv.* 2014 4 30617
- [17] A. Filippov F. U. Shah M. Taher S. Glavatskih O. N. Antzutkin *Phys. Chem. Chem. Phys.* 2013 15 9281
- [18] A. Filippov N. Azancheev F. U. Shah S. Glavatskih O. N. Antzutkin *Microporous Mesoporous Mater.* 2016 230 128
- [19] R. Giernoth *Top. Curr. Chem.* 2010 290 263
- [20] H. Li, in *Structures and Interactions of Ionic Liquids*, ed., S. Zhang, J. Wang, Q. Zhao, and, Q. Zhou, Structure and Bonding, Springer, 2014, vol. 151, p. 175
- [21] H. Tokuda K. Hayamizu K. Ishii A. B. H. Susan M. Watanabe *J. Phys. Chem. B* 2005 109 6103
- [22] A. E. Frise T. Ichikawa M. Yoshio H. Ohno S. V. Dvinskikh T. Kato I. Furó *Chem. Commun.* 2010 46 728
- [23] C. Jacob J. R. Sangoro P. Papadopoulos T. Schubert S. Naumov R. Valiullin J. Kärger F. Kremer *Phys. Chem. Chem. Phys.* 2010 12 13798

- [24] E. D. Hazelbaker R. Guillet-Nicolas M. Thommes F. Kleitz S. Vasenkov *Microporous Mesoporous Mater.* 2015 206 177
- [25] M. Nayeri M. T. Aronson D. Bernin B. F. Chmelka A. Martinelli *Soft Matter* 2014 10 5618
- [26] K. S. Han X. Wang S. Dai E. W. Hagaman *J. Phys. Chem. C* 2013 117 15754
- [27] T. Echelmeyer H. W. Meyer L. van Wüllen *Chem. Mater.* 2009 21 2280
- [28] W. S. Price, *NMR Studies of Translational Motion: Principles and Applications*, Cambridge University Press, Cambridge, 2009
- [29] H. Walderhaug O. Söderman D. Topgaard *Prog. Nucl. Magn. Reson. Spectrosc.* 2010 56 406
- [30] D. F. Evans A. Yamauchi R. Roman E. Z. Casassa *J. Colloid Interface Sci.* 1982 88 89
- [31] C. F. Poole B. R. Kersten S. S. J. Ho M. E. Coddens K. G. Furton *J. Chromatogr. A* 1986 352 407
- [32] P. T. Callaghan, *Principles of Nuclear Magnetic Resonance Microscopy*, Clarendon, Oxford, 1991
- [33] J. E. Tanner *J. Chem. Phys.* 1970 52 2523
- [34] J. C. Thater V. Gerard C. Stubenrauch *Langmuir* 2014 30 8283
- [35] F. A. Bovey, *Nuclear Magnetic Resonance Spectroscopy*, Academic Press, New York, 1988
- [36] J. A. Riddick, W. B. Bunger and T. K. Sakano, *Organic Solvents*, John Wiley and Sons, New York, 4th edn, 1985, vol. II, p. 578
- [37] J. A. Smith G. B. Webber G. G. Warr R. Atkin *J. Phys. Chem. B* 2013 117 13930
- [38] P. T. Callaghan and J. Stepisnik, in *Advances in Magnetic and Optical Resonance*, ed., W. S. Warren, Academic Press, San Diego, 1996, vol. 19, pp. 326-389
- [39] P. Linse O. Söderman *J. Magn. Reson., Ser. A* 1995 116 77
- [40] M. Levitt, *Spin Dynamics. Basics of Nuclear Magnetic Resonance*, Wiley & Sons, New York, 2nd edn, 2008