

## Diffusion of Ionic Liquids under Confinement

Properties of ionic liquids can be significantly different in interphase that from those in the bulk. NMR pulsed-field- gradient (PFG) was used to study self-diffusion of ethylammonium nitrate (EAN) [1] and phosphonium ortoborate ionic liquids (containing a phosphonium cation [P6,6,6,14]<sup>+</sup> and one of three orthoborate anions: bis(mandelato)borate, [BMB]<sup>-</sup>, bis(salicylato)borate, [BScB]<sup>-</sup> or bis(oxalato)borate, [BOB]<sup>-</sup>, in nanopores of Vycor porous glass [2] and between polar and non-polar (silanised) glass and PTFE plates in the temperature range 303 – 333 K [3]. It was found that diffusion coefficients of ions in these ILs dramatically increase in nanopores and along the solid surfaces and significantly decrease in the direction normal to the surfaces. Both ionic liquid properties and surface properties affect the diffusivity, while the effect is different along and normal to the surface.

Heating of the ionic liquid/Vycor system at 330 K during an extended period of time resulted in a significant change in diffusivity of ions, because of their redistribution in pores. Sizes of surface-bounded regions of ILs were estimated from the dependences of diffusivity of ions on the diffusion time in the PFG-NMR experiments.

### References

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2. Filippov A., Azancheev N., Shah F.U., Glavatskih S., Antzutkin O.N. Self-Diffusion of Phosphonium Bis(Salicylato)Borate Ionic Liquid in Pores of Vycor Porous Glass, *Micropor. Mesopor. Mater.* 2016 (submitted).
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