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Layers of ionic liquids with nitrate ions enclosed between micrometer-spaced glass plates

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Ionic liquids (ILs) have been widely used in a range of applications due to their unique physicochemical and electrochemical properties. For many of their practical applications, for example, in mechanical devices, supercapacitors, batteries, and catalytic reactors, etc., understanding the properties of ILs close to a solid surface or in confinement has crucial importance. Some protic and aprotic ionic liquids with nitrate anion (ethylammonium nitrate, ethyl methyl imidazolium nitrate and their mixtures with nitrate salts, being enclosed between a micrometer-spaced glass or quartz plates, demonstrates unusual dynamics of cations, which is different from that in bulk and in nano-confinement of these systems [1-3]. The dynamics of the ions is also reversibly changes during the exposure of the ILs in a static magnetic field [4]. These phenomena were analysed and interpreted as a results of intermolecular structure transformations occurring in the enclosed ILs. Conditions of the transformations were investigated by NMR-diffusometry and NMR-relaxometry. Nature and mechanisms of the transformations are under discussion.

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