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Lowering activation energy of ionic liquids within ionogels: liquid properties for solid devices

Ionogels represent a route to biphasic materials, for the use of ionic liquids (ILs) for all solid devices. Confining ILs within host networks enhances their averaged dynamics, resulting in improved charge transport. Fragility, short relaxation times, low viscosity, and good ionic conductivity, appear to be related to the IL / host network interface. The presence of ILs near interface leads to the breakdown of nanostructured areas existing in bulk ILs. This "destructuration",1 as well as segregative interactions at interface,2 coupled with percolation of the bicontinuous solid/liquid interface,3 make these materials very competitive among the existing solid electrolytes.
Such approach could provide a route to lower locally the viscosity of ILs, and an easier pathway for diffusion of charged species. Several types of ionogels demonstrate this effect, taking into account of fully inorganic, hybrid, polymeric or organic-inorganic host networks. This "all solid"approach can be applied to several devices, including lithium batteries4 and supercapacitors.5 A systematic study of the effect of size of confinement will be presented.

A. Guyomard-Lack et al., Phys. Chem. Chem. Phys., 16, 23639-23645 (2014)
A. Guyomard-Lack et al., New J. Chem., 40, 4269-4276 (2016)
C. V. Cerclier et al., Phys. Chem. Chem. Phys., 17, 29707—29713 (2015)
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Choix de session parallèle

4.2 Physique des polymères: de la molécule au matériau

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