

## **Application of alkoxy-silyl-functionalised polymerisable mesylate ionic liquids as electrolytes in electrochromic devices**

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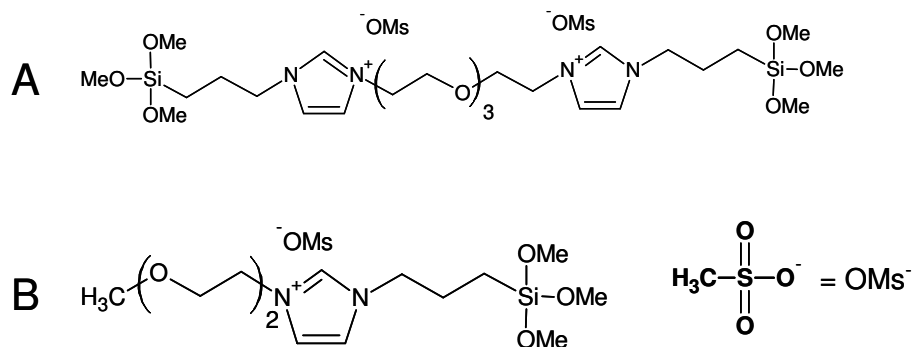
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Functionalization of imidazolium-based mesylate ionic liquids with sol-gel processable alkoxy-silyl groups yields materials that can be ranked as true organic-inorganic hybrids. By low-temperature processing and chemical design, hybrids are accessible combining the hardness of the inorganic domains with the flexibility of the organic part. Both properties are important when alkoxy-silylated ionic liquid precursors transform through the reactions of solvolysis and condensation into threedimensional silsesquioxane networks.<sup>1</sup> They guarantee mechanical durability and the formation of electrolyte gels without cracks. Such gel networks are capable of hosting non-reactive alkyl-functionalized ionic liquids, as well as of dissolving considerable amounts of various lithium salts.<sup>2</sup> The solubility of the latter can be controlled by the introduction of longer ethylenoxide chains. The prepared mesylate electrolytes were colourless and formed into thin membranes. Free alkoxy or silanol groups may generate strong bonds to the electrochromic WO<sub>3</sub> films and various counter electrode layers (NiO<sub>x</sub>, V<sub>2</sub>O<sub>5</sub>,...) of oxide-based electrochromic devices, thus resulting in good interfacial adhesion. Due to their chemical properties and mechanical flexibility, the materials can also be applied in devices containing electrochromic conductive polymers such as poly(3,4-ethylene dioxathiophene) (PEDOT) and even when flexible ITO/PET film is used as substrate.

[figure1]

[1] B. Orel, A. Šurca Vuk, V. Jovanovski, R. Ješe, L. Slemenik Perše, S. B. Hočevar, E. A. Hutton, B. Ogorevc, A. Jesih, *Electrochem. Comm.* 7 (2005) 692-696.

[2] A. Šurca Vuk, V. Jovanovski, A. Pollet-Villard, I. Jerman, B. Orel, *Sol. Energy Mater. Sol. Cells* 92 (2008) 126-135.



**Figure 1** Structures of mesylate ionic liquids: A) bis end-capped and B) single end-capped alkoxy-silyl-functionalised precursors.

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