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Ionic liquid crystals based on 1,2,4-triazolium rings

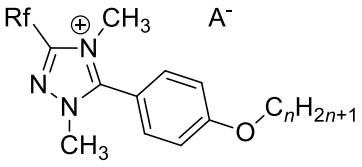
Alessio Riccobono[1,2*], John M. Slattery[1], Adrian C. Whitwood[1], Rachel R. Bean[1], Duncan W. Bruce[1], Ivana Pibiri [2] and Andrea Pace[2]

[1] Department of Chemistry, University of York, Heslington, YO10 5DD, York, UK
[2] STEBICEF, University of Palermo, Viale delle Scienze Ed. 17, 90128, Palermo, Italy

Ionic liquids crystals (ILCs) are a class of organic materials of great current interest. They show unique properties that can be exploited in many different fields, for example their use as solvents for extraction processes as well as electrolytes for batteries, fuel cells, dye-sensitised solar cells *etc.* [1-4]

Moreover, in perfluorinated ILCs, the segregation of the perfluorocarbon chains promotes further self-organisation of the LC phases, adding to the materials further properties such as affinity for gases suitable for example in gas-storage. [5-7]

A series of salts based on 5-(4-alkyloxyphenyl)-1,4-dimethyl-3-(perfluoroalkyl)-1,2,4-triazol-4-ium structures, differing in the length of the alkyl and perfluoroalkyl chains as well as in the counter ion, have been synthesised and characterised (Scheme 1). Compounds with perfluoroheptyl and perfluorononyl chains showed liquid crystal properties and the general temperature range depended on the anion used. The phase behaviour was dominated by the formation of the SmA phase, although the BF_4 salts also showed a SmB phase. The liquid crystal properties have been studied by POM, DSC, X-ray and neutron diffraction and the results of these studies will be reported.



Rf= C_3F_7, C_7F_{15}, C_9F_{19} n= 10, 12, 14

A^-= OTf^-, BF_4^-, NTf_2^-

Scheme 1. Materials included in this study

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*) Author for Correspondence: alessio.riccobono@unipa.it, ar1271@york.ac.uk