



A multinuclear NMR study of a thermotropic ionic liquid crystal

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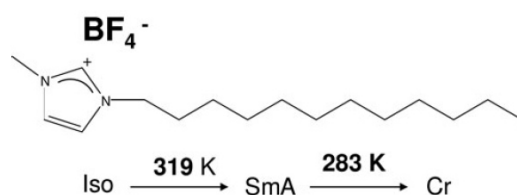
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Abstract: Thermotropic ionic liquid crystals are considered very promising for a wide range of applications, such as anisotropic conductors as well as electrolytes in dye-synthesized solar cells [1]. Their potential comes from the unique combination of ionic conductivity and high polarizability [1]. In this presentation we report a multinuclear NMR study of the Smectic A phase formed by the cationic smectogen, N-docecyl-N'-methylimidazolium (C12mim), with two different counter ions. NMR is exploited to gather information on the molecular dynamics, measuring the anisotropic translational molecular diffusion [2], as well as on the structure of the phase at a molecular level, measuring ¹⁵N-¹³C dipolar couplings [3]. In particular, we show that, despite very low abundance of 0.004% for the naturally occurring ¹⁵N-¹³C pairs, sensitive and resolved spectra can be recorded within hours of experimental time using conventional NMR instruments with moderately strong magnetic field (11.7 T in the present case)[3], making the technique feasible to be generally applied to nitrogen containing mesogens.



References:

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[3] Dvinskikh S.V., Cifelli M., Domenici V., Chizhik V.I., ¹⁵N-¹³C Dipole Couplings in Smectic Mesophase of a Thermotropic Ionic Liquid. *Appl Magn Reson*, 49, 553

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