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BOOK OF ABSTRACTS

INHERENTLY CHIRAL SUPPORTING ELECTROLYTES AND IONIC LIQUIDS

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Our group has recently proposed electroactive thiophene-based polyconjugated films of unprecedented chirality manifestations and enantiorecognition ability [1-3] based on the concept of the whole electroactive backbone coinciding with the stereogenic element, consisting in a tailored torsion induced by an atropisomeric bi-thiophene scaffold.

Now we are applying the same "inherent chirality" approach to the development of inherently chiral supporting electrolytes and ionic liquids, hopefully endowed with high enantioselectivity, like the formerly developed inherently chiral electrodes. The new molecules are based on cations including different atropisomeric bis-benzimidazolium or bi-collidinium groups acting as the stereogenic element, responsible for both the molecular chirality and the IL properties of the material, modulated by the number, position and length of alkyl chain substituents.

Three examples will be presented and discussed in terms of electrochemistry and chirality, namely 1,1'-bis-benzimidazolium salts [4], 2,2'-bis-benzimidazolium salts, and 3,3'-bi-collidinium salts. The high torsional angle of 1,1'-bis-benzimidazole and 3,3' -bi-collidinium salts results in an energy barrier high enough to yield permanently stable enantiomers at room temperature. The length and number of allkyl chain substituents, as well as the nature of the counteranion, modulate the melting point, a determining parameter for use as ionic liquids or supporting electrolytes.
Preliminary enantiorecognition tests will be presented and discussed.

[1] *Angewandte Chemie Int. Ed.*, 2014, 53, 2623
[2] *Chemistry-A European Journal*, 2014, 10, 15261
[3] *Chemical Science*, 2015, 6, 1706
[4] *Electrochimica Acta*, 2015, in press

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