Ionic liquid electrolytes for sodium battery systems

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Na^+-conducting, binary electrolytic mixtures, based on 1-ethyl-3-methyl-imidazolium, trimethyl-butyl-ammonium, *N*-butyl-*N*-methyl-piperidinium *and N*-alkyl-*N*-methyl-piperidinium ionic liquid (IL) families, were designed and investigated. The anions were selected among the per(fluoroalkylsulfonyl)imide families. Sodium bis(trifluoromethylsulfonyl)imide, NaTFSI, were selected as the salt. The NaTFSI-IL electrolytes, for being addressed to safer, room temperature, sodium-ion battery systems, were studied and compared in terms of ionic conductivity and thermal stability, as a function of the temperature, nature of the anion and cation aliphatic side chain length. The results are here reported and discussed.