

ION FRAGMENTATION STUDY OF [EMMIM][TFSI], [EMIM][OTf] AND [EMIM][DCA] BY VACUUM ULTRAVIOLET LIGHT

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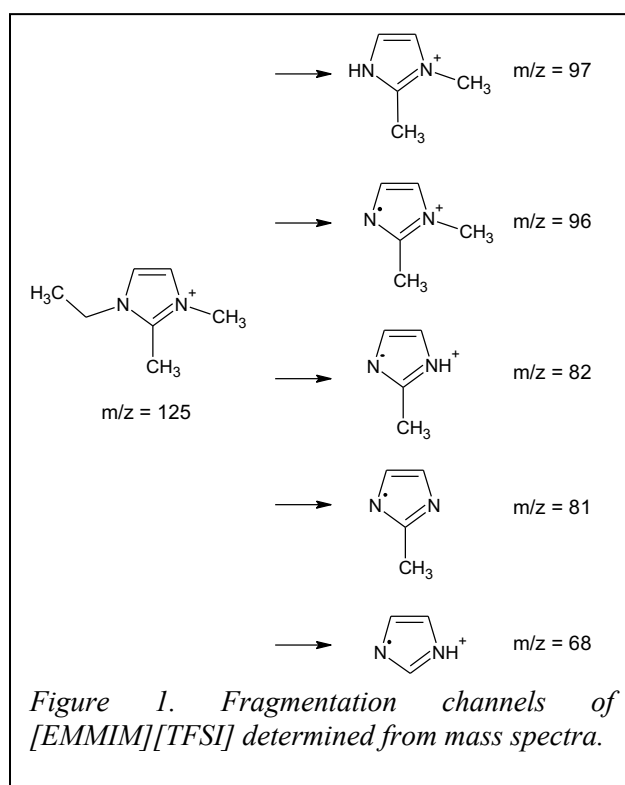
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Isolated molecules of ionic liquids 1-Ethyl-2,3-dimethylimidazolium bis(trifluoromethylsulfonyl)imide [EMMIM][TFSI], 1-Ethyl-3-methylimidazolium trifluoromethanesulfonate [EMIM][OTf] and 1-Ethyl-3-methylimidazolium dicyanamide [EMIM][DCA] were evaporated by effusion. The fragmentation of vaporized species was investigated using tunable vacuum ultraviolet light and time-of-flight mass spectrometry. Different fragmentation pathways were discussed and detected decomposition products analyzed.

A TOF-MS study on the fragmentation of [EMMIM][TFSI], [EMIM][OTf] and [EMIM][DCA] ionic liquids has been successfully carried out using photoexcitation with energies from 9 to 16 eV. The most intense cation signal was detected in the case of [EMMIM][TFSI]. It was unexpectedly observed that [EMMIM][TFSI] does not fragment to [EMIM]⁺ nor [12EMIM]⁺ in the photon energy range 10.5 to 16 eV (figure 1). Exposing [EMIM][DCA] to temperature of 140 °C for more than eight hours leads to the liquid phase formation of temperature induced reaction product 2-cyanoimino-1-ethyl-3-methylimidazole.



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