

Fabrication of ionic liquid-based polymer electrolyte with the aid of atmospheric pressure plasma

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The current work represents innovative fabrication process termed as interfacial liquid plasma polymerization (ILPP). ILPP fabrication process was carried out with the aid of atmospheric pressure plasma. In this fabrication process a series of all-solid state and free-standing polymer electrolytes in which [BMIM][BF₄] was employed as a building block and non-ionic surfactants with a different length of a hydrophilic chain such as Triton-X 100 Triton-X 405 and Triton-X 705 were used as an assisted-cross-linking agents. The thickness of the fabricated polymer electrolyte films was controlled by the ratio of surfactant to ILs and the plasma exposure time. The properties and chemical structures of the fabricated films were characterized by using spectroscopic, biophysical and electrochemical techniques. The relationship between number of the EO unit, thickness and ionic conductivity of the ionic liquid-based polymer electrolyte film was examined. The thickness, ionic conductivity of the films varied with increasing the EO unit of non-ionic surfactant to ionic liquid mixture.