

Effect of 1-butyl-3-methylimidazolium chloride ionic liquid to the properties of PEDOT:PSS films and its application in the organic solar cell

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Acidic and pH neutral solution of poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) (PEDOT:PSS) were modified by 1-butyl-3-methylimidazolium chloride (BMIM<sup>+</sup> Cl<sup>-</sup>) ionic liquid (IL). Organic solar cells (OSCs) based on PTB7:PCBM bulk hetero-junction with these modified PEDOT:PSS as the hole transport layer were fabricated to investigate the effect of the treatment. The power conversion efficiency (PCE) of polymer solar cell was decreased when using IL doped acidic PEDOT:PSS and improved when IL doped pH neutral PEDOT:PSS was used as a hole transport layer. The improvement of device performance could be attributed to the improvement in conductivity of modified pH neutral PEDOT:PSS layer, which could help improve the hole charge mobility and collectivity.

Keywords: Organic solar cells, PTB7:PCBM, ionic liquid, modified PEDOT:PSS, EGaIn electrode