

The influences of additives on electrolytes and their quantitative injection method on Dye-sensitized solar cells

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The influences of t-butyl pyridine (t-BP), guanidine thiocyanate (GuSCN) and Tetrabutylammonium iodide (TBAI) in ionic liquid based electrolyte as additives, on the photovoltaic performance of dye-sensitized solar cells (DSSCs) were investigated. Dye-sensitized solar cell consists of TiO_2 nanoporous film of the photo electrode, dye molecules on the surface of the TiO_2 film, electrolytes and a counter electrode. Among these, optimization of electrolytes composition is the most important for high efficiency. Its variation influences on the internal impedances of DSC related to the electron transport. Therefore, the composition of the electrolytes affects the cell performance such as current density (J_{sc}), open circuit voltage (V_{oc}) and fill factor (FF). In this study, we analyzed the characteristics of DSC with the different additional materials in electrolytes by using electrochemical impedance spectroscopy (EIS). The measurement was carried out after the open circuit voltage was stabilized. Finally, Additives in ionic liquid based electrolytes are optimized for the best performance of DSC.