Improved photovoltaic performances of dye-sensitized solar cells by modifying interfacial properties between polymer gel electrolyte and counter electrode

김소은, 이지은, 강보성, 강문성†
상명대학교
(solar@smu.ac.kr†)

There has been much attention towards dye-sensitized solar cells (DSSCs) for the past decades due to their attractive features such as reasonable energy conversion efficiency and low energy production cost. Recently, cobalt complexes have been suggested as one of the most promising candidates for replacing conventional iodine redox shuttles owing to their high voltage characteristics. Although high energy efficiency exceeding 12% was reported by employing liquid electrolyte that consists of cobalt complex redox mediator and volatile solvent, the use of volatile liquid solvent cannot ensure the long-term stability of DSSCs. In this work, therefore, novel polymer gel electrolytes (PGEs) including cobalt complexes as redox couples have been developed for efficient and long-term stable DSSCs. In addition, several types of conjugated polymer based counter electrodes have been prepared and used for the fabrication of DSSCs to decrease the high charge transport resistance occurred between the PGE and counter electrode. This work was supported by a grant (RE201702218) from the Environmental Industry Advancement Technology Development Project of KEITI.