

Characteristics of Perovskite solar cells with TiO₂ electron transfer layer coated by cyclic voltammetry method

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The characteristics of Perovskite solar cells with the TiO₂ electron transfer layer(ETL) coated by the cyclic voltammetry method were investigated. The three electrodes as a counter, reference, and working electrodes of the cyclic voltammetry method were composed of stainless steel, Ag / AgCl, and FTO glass, respectively. The cyclic voltammetry method was used for coating of the TiO₂ on FTO substrate. The three electrodes were put in aqueous TiCl₄ solution and electrochemically coated to 3 to 7 cycles at a scan rate of 0.01 V/s. The schematic of solar cell was FTO glass / TiO₂ ETL / Perovskite(CH₃NH₃PbI₃) / spiro-OMeTAD / Ag electrode. The chemical bond of the TiO₂ 2p_{3/2} peak was confirmed at 458.8 eV using XPS. The crystal structure of TiO₂ was confirmed as the anatase and rutile structures by XRD. The electrical characteristics of the Perovskite solar cells with electrochemically coated TiO₂ ETL were confirmed by a solar simulator. The photoelectric conversion efficiency of up to 8.4% was obtained in the Perovskite solar cells with TiO₂ ETL coated four times by the cyclic voltammetry method.