

Characterization of Perovskite solar cell with copper oxide seed layer produced by hydrothermal synthesis using acids

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Nano-structured copper oxide was synthesized as the seed layer in the Perovskite solar cell by hydrothermal synthesis using acids. The effect of nano-structured seed layer on perovskite solar cells was studied. Copper oxide is more stable and less-expensive than PEDOT:PSS and Spiro-MeOTAD when used as a hole transfer layer. When the hydrothermal synthesis method using no acid was used, the photoelectric conversion efficiency was not measured because of its thickness. The structure of this device is FTO / CuO / Cu₂O / CH₃NH₃PbI₃ / PCBM / Ag. The CuO, Cu₂O, CH₃NH₃PbI₃ and PCBM were used as a seed layer, a hole transfer layer, an active layer, and an electron transfer layer, respectively. The morphology, the chemical bonding and component, thickness of hole transfer layer was measured by using SEM, XRD and EDX, Alpha step photometer, respectively. The electrical characteristics of the device were measured using a solar simulator. It was confirmed that the thickness of the copper oxide produced by the hydrothermal synthesis method using an acid became thin, and the photoelectric conversion efficiency was improved.