

Passivation process and characteristics of aluminum nanoparticles for electrode with low-work function

정대수, 박승빈*

한국과학기술원

(SeungBinPark@kaist.ac.kr*)

The Al electrode used as backside contact in photovoltaic cells is obtained by sintering a screen-printed layer formed from Al paste. The size of Al particles used for Al paste is several micrometers which increases sintering temperature and decreases electrical properties. Thin Al films used as cathode materials are formed by deposition process in high vacuum atmosphere, which increases production cost and make it difficult to increase size of substrate.

Recently, for decreasing the sintering temperature and using low cost process such as ink-jet, dip-coating and screen printing, much effort has been devoted to the preparation of nano-sized Al particles. Al nanoparticles are easily oxidized when particle surface are exposed to air. Approximately half of the weight of the air-passivated 30nm Al particles is aluminum oxide, which decreases electrical properties and increases sintering temperature. Thus, the Al nanoparticles should be passivated by coating protection layer which prevents rapid oxidation to Al oxide under atmosphere conditions. In this work, we proposed a passivation process and analysis methods of active aluminum in organic-passivated Al particles and the possibility as next-generation electrode prepared by a solution process.