

Ag paste와 실리콘 웨이퍼의 반응성에 따른 태양전지의 전기적 성질

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Electrical Properties of Solar Cells With the Reactivity of Ag pastes and Si Wafer

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Abstract : Ag thick film has been used for electrode materials with the excellent conductivity. Ag electrode is used in screen-printed silicon solar cells as a electrode material. Compared to photolithography and buried-contact technology, screen-printing technology has the merit of fabricating low-priced cells and enormous cells in a few hours. Ag paste consists of Ag powders, vehicles and additives such as frits, metal powders (Pb, Bi, Zn). Frits accelerate the sintering of Ag powders and induce the connection between Ag electrode and Si wafer. Thermophysical properties of frits and reactions among Ag, frits and Si influence on cell performance. In this study, Ag pastes were fabricated with adding different kinds of frits. After Ag pastes were printed on silicon wafer by screen-printing technology, the cells were fired using a belt furnace. The cell parameters were measured by light I-V to determine the short-circuit current, open-circuit voltage, FF and cell efficiency. In order to study the relationship between the reactivity of Ag, frit, Si and the electrical properties of cells, the reaction of frits and Si wafer on was studied with thermal properties of frits. The interface structure between Ag electrode and Si wafer were also measured for understanding the reactivity of Ag, frit and Si wafer. The excessive reactivity of Ag, frit and Si wafer certainly degraded the electrical properties of cells. These preliminary studies suggest that reactions among Ag, frits and Si wafer should optimally be controlled for cell performances.

Key Words : Ag paste, Frits, Reactions, Silicon solar cell