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무전해 도금을 적용한 결정질 실리콘 태양전지의 효율 향상

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Crystalline silicon solar cell is a semiconductor device that converts light into electrical energy. Screen printing is commonly used to form the front/back electrodes in silicon solar cell. Screen printing method is convenient but usually shows high resistance and low aspect ratio, which cause the efficiency decrease in crystalline silicon solar cell. Recently the plating method is applied in c-Si solar cell to reduce the resistance and improve the aspect ratio. In this paper, we investigated the effect of additional electroless Ag plating into screen-printed c-Si solar cell and compared their electrical properties. All wafers used in this experiment were textured, doped, and anti-reflection coated. The electrode formation was performed with screen-printing, followed by the firing step. After then we carried out electroless Ag plating by changing the plating time in the range of 20 sec~5 min and light intensity. The light I-V curve and optical microscope were measured with the completed solar cell. As a result, the conversion efficiency of solar cells was increased mainly due to the decreased series resistance.

Keywords: Crystalline silicon solar cell, Screen-printing, Electroless plating