

Studies of the mechanism of stress applied to the plating film and the substrate of silicon delamination using simulation

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Thin-film crystalline silicon solar cells have a great potential for high quality, cheap and high efficiency solar cells. Low cost of the manufacturing process is in progress. To reduce the cost of manufacturing process, the plating process was analyzed by using the simulation of stress applied to silicon substrate.

In this study, the occurring of metal-silicon interface was modeled to predict the quantitatively of stress affecting inside the silicon substrate. We predicted through the changing of simulation what the factors will give a large effect on the value of the results. The stress characteristic factor was specified as a parameter in the major factor of the substance to be plated.

Mechanical properties of plating materials have changed density, coefficient temperature expansion and Young's modulus. Density is not expected to give greater effecting on stress. In the case of temperature, it was affected directly on the thermal expansion of the material. Lead to the peeling phenomenon occurred from the silicon substrate, to control the main factor, the CTE and Young's modulus is expected.