

Multi-crystalline Silicon Solar Cell with Reactive Ion Etching Texturization

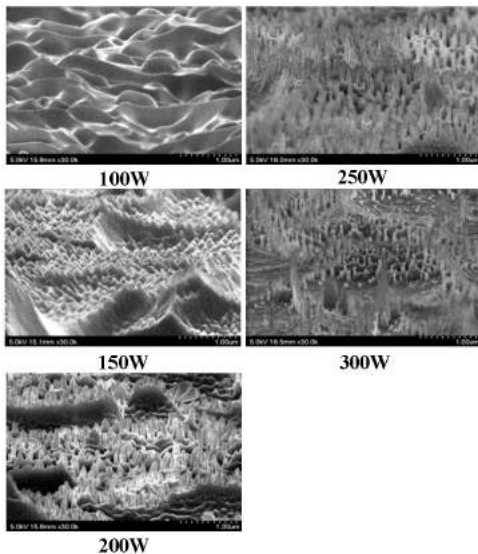
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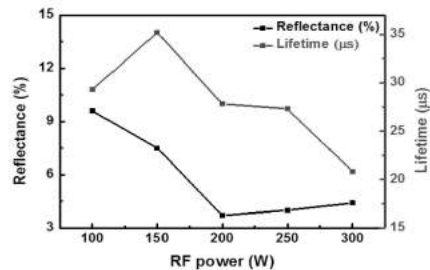
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High efficiency silicon solar cell requires the textured front surface to reduce reflectance and to improve the light trapping. In case of mono-crystalline silicon solar cell, wet etching with alkaline solution is widespread. However, the alkali texturing methods are ineffective in case of multi-crystalline silicon wafer due to grain boundary of random crystallographic orientation. The acid texturing method is generally used in multi-crystalline silicon wafer to reduce the surface reflectance. However the acid textured solar cell gives low short-circuit current due to high reflectivity while it improves the open-circuit voltage. To reduce the reflectivity of multi-crystalline silicon wafer, double texturing method with combination of acid and reactive ion etching is an attractive technical solution. In this paper, we have studied to optimize RIE experimental condition with change of RF power (100W, 150W, 200W, 250W, 300W). During experiment, the gas ratio of SF6 and O2 was fixed as 30:10.

Keywords: RIE(Reactive Ion Etching), reflectance, crystalline silicon solar cell



〈 SEM image of RIE-textured silicon wafer with variable RF powers 〉



〈 Lifetime and reflectance measurements of RIE-textured silicon wafer with a change of the RF powers after firing 〉