
Study of crystalline silicon solar cells texturing process with SF₆ atmospheric pressure plasma

Woo Jae Kim¹, Hwan Hee Lee¹, Hee Tae Kwon¹, Gi Won Shin¹, Chang Sil Yang², and Gi-Chung Kwon¹

¹*Kwangwoon Univ., Korea, Republic of*

²*Y.I. TECH, Korea, Republic of*

Nowadays, Reactive Ion Etching (RIE) and WET etching are employed in existing texturing processes to fabricate solar cells. However, the photovoltaic conversion efficiency and the production cost of photovoltaic power generation, which are billions of times, have a negative impact on the commercialization of photovoltaic power generation. To solve this problem, this study proposed a method of etching the surface of crystalline silicon solar cell by using atmospheric pressure plasma. The silicon surface was etched using atmospheric plasma in the form of a dielectric barrier discharge using RF power. It was confirmed that the silicon surface was etched by the same principle as reactive ion etching when etching with atmospheric pressure plasma.

The characteristics of etched silicon wafers were compared at atmospheric pressure plasma etching using RF power and gas flow rate. The etched silicon wafers were fabricated to confirm the electrical properties such as reflectance and current - voltage characteristic curves, and confirmed the possibility of applying them to the crystalline silicon surface etching and solar cell manufacturing process using atmospheric plasma. It is expected that atmospheric plasma will be applied to semiconductor manufacturing process such as solar cell in the future.