

PO2074

**Surface Modification by Atmospheric Pressure Plasma Jet for Texturing Monocrystalline Silicon Solar Cell**Jhao-Yu Guo<sup>1</sup>, Yu-Lin Kuo<sup>2</sup>, Hsien-Po Wang<sup>2</sup><sup>1</sup>NTUST, Taipei City, Taiwan <sup>2</sup>NTUST, Taipei, Taiwan

D10603008@mail.ntust.edu.tw

Types of atmospheric-pressure plasma technology, such as the thermal plasma torch, corona discharge, plasma arc, and plasma jet have been widely used in the field of surface treatment. In this study, atmospheric-pressure plasma jet (APPJ) was conducted to increase the surface roughness' structure of silicon wafers for the further texturing process with alkaline etching solution immersion. The surface characterizations and morphologies of APPJ-treated samples were observed by water contact angle (WCA) and field emission scanning electron (FE-SEM), respectively. The reflection behaviors were collected to analyze the samples' light absorption. The results show that the factors of scanning times, the distance of substrate to nozzle, and the plasma power highly affected the surface due to the levels of plasma ion bombardments on samples. Subsequently, the APPJ-treated samples were immersed in the alkaline etching solution to obtain a pyramid structure. Moreover, this study shows that the formation of pyramid structures was obtained with a lower reflectivity of 5%. Furthermore, this study proves that the combination of pre-treatment by APPJ on monocrystalline silicon and etching process is evidently proved to reduce the etching time and the quantity of etching solution, which can be viewed as the green chemistry for the solar cell industry.

**Keywords**

Atmospheric Pressure Plasma Jet

Surface modification

Alkaline etching solution

Pyramid structure