
A Study On Crystalline SolarCell Phosphorous Doping Using Atmospheric Pressure Plasma

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Plasma is widely used for semiconductor fabrication. We found that atmospheric plasma could be used for solar cell doping process. General method of solar cell doping is using diffusion furnace. However furnace needs expensive equipment and it has to purge a poisonous gas. It is significant that the depth and concentration of impurities to fabricate the high efficiency solar cell. But also the production cost became a major factor of solar cell industry. This study simplifies the fabrication process of solar cell and reduces the cost by using atmospheric plasma in terms of removing unnecessary process. Our suggestion method is that liquefied phosphoric acid was spread on the wafer surface in the way of spin coating. Then wafer was treated by argon plasma for several seconds. Until now we have researched the doping process and measured doping profile with various shape of electrode such as plasma jet and narrow line shaped-dielectric barrier discharge (DBD). In this study, we change the electrode to comparatively wide rectangular shaped DBD type plasma. Then, we measured the doping profile and characteristics of solar cell with atmospheric plasma treatment. With this study, we are trying to modulate the doping depth, and doping concentration by changing the plasma discharge condition.

Keyword: Atmospheric plasma, Solar cell, Doping profile, plasma jet, dielectric barrier discharge (DBD),