Dissertation Title	The Development of Solar Cell Surface by Plasma Technique
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Abstract

This research is to study and to make Indium Tin oxide (ITO) thin film on polyethylene naphthalate (PEN) substrate by Naturatron sputtering technique using the mixture of argon and oxygen gas during the deposition. The thin film surface was investigated by scanning electron microscope (SEM) to study the film characteristics and Energy Dispersive Spectroscopy (EDS) to study the film compositions. It was found that the Naturatron sputtering method deposited the ITO thin film with the thickness of 145 ηm and the roughness of 0.39 ηm on the PEN film substrate. Besides, this research also developed the surface of metal layer and PEN plastic using by low-pressure high-frequency plasma chemical vapor deposition (CVD) system for oxygen surface treatment with the mixture of argon and oxygen gas during the treatment. A mixture of Ar and O_2 gas was used in the plasma treatment. The oxygen gas flow rate was between 0.1 L/min and 0.5 L/min, whereas the Ar gas flow rate was set at 10 L/min. The surfaces were investigated by using a contact angle meter to study hydrophilic properties and X-ray photoelectron spectroscopy (XPS) to study the composition of the film characteristics. It was found that low-pressure high-frequency plasma chemical vapor deposition (CVD) system could be used to measure hydrophilic properties and cause radicals on the surface resulting in high oxidation in the flexible solar cell production by roll to roll (R2R) technology.

Keywords: Argon+Oxygen mixture gas/Flexible solar cell/Indium tin film/Plasma technique/ Polyethylene naphthalate (PEN)