High density silane plasma for amorphous silicon coating

HIGH DENSITY SILANE PLASMA FOR AMORPHOUS SILICON COATING

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Abstract

Amorphous silicon films of solar cell quality are deposited using silicon plasma. The growth rate of the film, which is one of the cost determining factors, has significant dependence on the plasma density and its composition. High density, hydrogen rich plasma is used to deposit 500 nm thick films of amorphous silicon in 5s. The film growth is monitored with in - situ ellipsometry. Emmision spectroscopy and double probe measurements have been used to characterise the plasma. The substrate temperature and potential are also monitored continuously during the film deposition. Since impurity in the chamber can vitiate the film properties, clean background pressure of 3.10^{-6} mbar is attained by means of a turbomolecular pump. Moreover, load - lock arrangement is used for loading and unloading the substrate and this has proved highly benificial for maintaining the clean working conditions in the chamber.The entire process is computor controlled. Film properties like temporal variation of oxygen concentration, refractive index, band gap and photoconduvtivity are also studied.

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