A Study on TiO₂ Thin Film by PLD for Buffer Layer between Mesoporous TiO₂ and FTO of Dye-sensitized Solar Cell

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Abstract: Dye-sensitized Solar Cell (DSC) is a new type of solar cell by using photocatalytic properties of TiO₂. The electric potential distribution in DSCs has played a major role in the operation of such cells. Models based on a built-in electric field which sets the upper limit for the open circuit voltage(Voc) and/or the possibility of a Schottky barrier at the interface between the mesoporous wide band gap semiconductor and the transparent conducting substrate have been presented. TiO₂ thin films were deposited on the FTO substrate by Nd:YAG Pulsed Laser Deposition(PLD) at room temperature and post-deposition annealing at 500 °C in flowing O₂ atmosphere for 1hour. The structural properties of TiO₂ thin films have investigated by X-ray diffraction(XRD) and atomic force microscope(AFM). Thickness of TiO₂ thin films were controlled deference deposition time and measurement by scanning electron microscope(SEM). Then we manufactured a DSC unit cells and I-V and efficiency were tested using solar simulator.

Key Words: DSC, TiO₂, PLD