

Synthesis and Characterization of Organic-Inorganic Perovskite Material for Solar Cell Application

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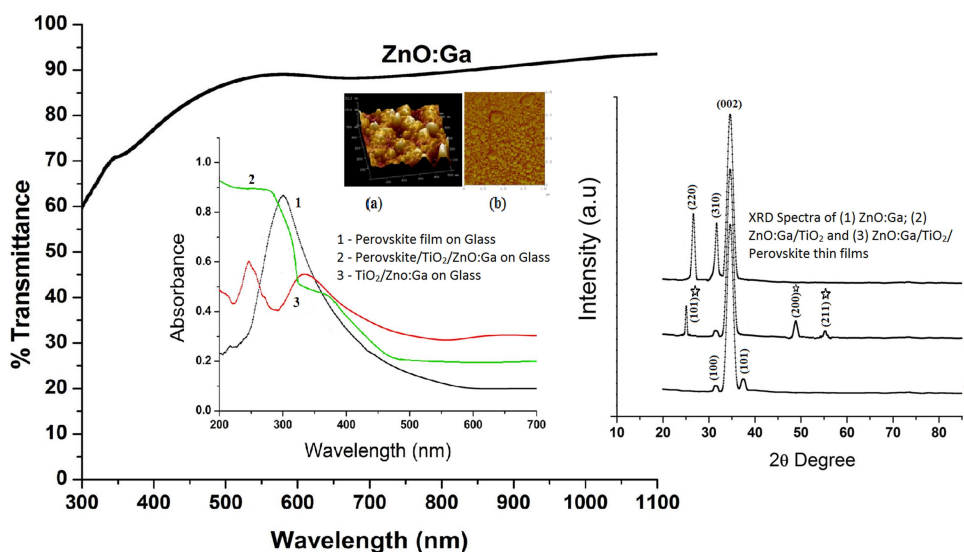
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Abstract: Organic-Inorganic Methylammonium lead Iodide ($\text{CH}_3\text{NH}_3\text{PbI}_3$) based perovskite was prepared on mesoporous $\text{TiO}_2/\text{ZnO}:\text{Ga}$ (GZO) coated glass substrate with two step spin coating technique. Ga doped ZnO ($\text{ZnO}:\text{Ga}$) thin films have been deposited by RF-Magnetron sputtering at room temperature on glass substrate and show $4.3 \times 10^{-4} \Omega \cdot \text{cm}$ electrical resistivity alongwith high optical transmittance (above 89%) and a haze factor of 52% respectively. Mesoporous TiO_2 (mp- TiO_2) paste is coated on GZO coated glass by doctor's blending method and heat treated TiO_2 powder shows both (101) and (200) anatase phases. (101) and (200) crystalline phases are mainly responsible for higher absorption coefficient in mixed TiO_2 powder. Methylammonium lead Iodide ($\text{CH}_3\text{NH}_3\text{PbI}_3$) (MAPbI_3) perovskite/ $\text{TiO}_2/\text{ZnO}:\text{Ga}$ tri-layer structure shows unique electrical and optical characteristics for Organic-Inorganic solar cell applications.

Keywords: $\text{CH}_3\text{NH}_3\text{PbI}_3$ perovskite, $\text{ZnO}:\text{Ga}$ thin film, Optical Absorption, AFM.