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Synthesis and characterization of Halide Perovskite Materials for Photovoltaic Application

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Among all the components of perovskite solar cells (PSCs), the perovskite materials play a central role in light absorption and photoelectric conversion. The optimization of the materials and structures is a key to enhancing the conversion efficiency. The perovskite materials for inclusion into solar cells were prepared by one and two-steps solution fabrication process to generate polycrystalline structures with diverse grain sizes. PbI_2 , PbCl_2 and MAI were used in the synthesis of organic-inorganic hybrid perovskite, as they facilitate the formation of well-organised perovskite layer. In a quest to improve the performance of these devices, the effect of synthesis approach on the properties of the material have been investigated. Our fundamental objective therefore was to determine how synthesis influences the structure and the properties of perovskite material for the application in photovoltaic cell. Samples were characterized by X-ray diffraction (XRD), scanning electron microscope (SEM), UV-Vis spectrometry and thermogravimetric analysis (TGA). Subsequent to the characterization the light harvesting efficiencies of these materials have been investigated which is significant for photovoltaic materials.

Key words: Hybrid perovskite, solar cells, synthesis, properties, characterization

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