EXPLORATION OF PEROVSKITE SOLAR CELL, A FUTURE ENERGY DEVICE

Nhu Nguyen

College of Engineering
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Abstract: The energy and environmental issues promote the research about renewable energy sources that are pollution-free and contribute towards reducing the greenhouse effects. Out of many renewable energy sources, Solar Photovoltaic (PV) systems are most popular which convert solar energy into electricity. Commonly used PV systems are silicon based. However, Perovskite Solar Cells (PSCs) based on metal halides are gaining popularity as the most promising and competing PV technology because of its high power efficiencies coupled with low production cost and ease of fabrication. Organometal halide perovskite solar cell follows a general perovskite crystal structure of ABX3, where A is a larger cation such as methylammonium (MA+), formamidinium (FA+) and B is a smaller cation such as lead (Pb+2) or tin (Sn+2) and X is an anion consisting of halide such as Iodine (I-), chlorine (Cl-) or bromine (Br-). PSCs include five layers: fluorine-doped tin oxide (FTO) glass, electron transport layer (ETL), Perovskite layer, hole transportation material (HTM), and counter electrode (Ag, Au, Pt, carbon etc). This project researches the performance of PbI2 with Methylammonium Iodide (MAI) as a perovskite layer, poly(3-hexylthiophene-2,5-diyl) (P3HT) as a hole transportation material, and mesoporous carbon as counter electrode, which led to a high efficiency of up to 12.17%.

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