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Zn-6mna MOF Embedded Thin-film Polymer Electret in OFET Memory

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Abstract

Metal-organic frameworks (MOFs) are highly ordered structures characterized by a high specific surface area, adjustable porosity, excellent thermal stability, and a wide variety of metal nodes and organic linkers. Recently, MOFs have emerged as a promising material for wearable electronics. Previous research has shown that the tetrahedral structure of Zn-6mna provides numerous active sites, resulting in excellent electrocatalytic performance in dye-sensitized solar cells (DSSCs). However, its potential in other semiconductor devices remains largely unexplored.

In this study, thin films of the MOF Zn-6mna were precisely prepared using the hot solvent method with varying acid concentrations, acidification times, and reaction durations. These MOF thin films were then applied as charge storage materials with the polystyrene blocking layer in organic field-effect transistor (OFET) memories. Scanning electron microscopy (SEM) and X-ray diffraction (XRD) were employed to analyze the morphology of the thin films, while electrical measurements were used to assess the carrier mobility and charge storage capacity of the devices. This study offers a systematic analysis of the charge storage performance of MOF films in different phases for memory applications in transistor-based devices.