

Title: Emerging Metal Organic Frameworks: Synthesis and Applications for 2D Conductive Materials

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Metal-Organic Frameworks (MOF) are studied extensively in applications like catalysts, gas storage and sensors due to their various functional groups and porous structures. Two dimensional MOFs such as triphenylene-based materials show excellent charge transport properties but thin film fabrication and organic ligand synthesis are difficult. In this work, we synthesize thiol-based organic ligand, benzenehexathiol (BHT), by a simple one-pot reaction. This facile method is safer and faster than conventional synthesis procedure which requires using liquid ammonia as solvent. We also demonstrate an efficient approach for fabrication of MOF thin film by growing MOFs on functionalized substrates. Group 11 elements are used in this study to achieve planar coordination of metal ions and thiols in BHT. Functional group of silane on the substrate can loosely bound to BHT or metal ions, leading to high quality MOF thin films. The resulting MOFs exhibit negative relation between conductivity of MOFs and radii of metal ions. This general method can be used to control the growth of 2D or 3D MOF on silicon substrates. In this work, we also demonstrate the moisture sensor by using MOFs thin film.

Biography

Iu-Fan Chen double-majors in Materials Science and Engineering and Chemisty in National Taiwan University, and is expected to graduate in 2018 Fall. He researches thiol-based Metal-Organic Framworks (MOF) and in Frontier Material Lab under Professor Wei-Fang Su, who is the Distinguished Professor of Department of Materials Science and Engineering, National Taiwan University.

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