

Facile Synthetic Route to Non-layered Two Dimensional ZIF Nanosheets for Enhanced Catalytic Activity

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Two-dimensional (2D) MOF nanosheets (NSs) have recently gained numerous interest owing to their structural advantages such as large surface area and exposed reactive sites. Two different types of 2D MOF NSs have been reported including inherently layered MOFs and non-layered ones. As compared to the layered 2D MOF NSs, a few studies on non-layered 2D MOF NSs have been reported, presumably due to its strong structural preference to form three dimensionality. Here, we introduce a facile synthetic route to non-layered 2D ZIF NSs in aqueous phase at room temperature, without using any surfactant and modulator. This is achieved by converting ultrathin layered hydroxide salt (LHS) NSs into non-layered 2D ZIF NSs through the addition of ligand solution to the LHS NS suspension. The facile synthetic route to non-layered 2D ZIF NSs is ensured by preparing both non-layered 2D ZIF-67 and ZIF-8 NSs that are most popular MOF among the ZIF family. The non-layered 2D ZIF-67 NSs are employed as catalysis for the synthesis of imidazole derivatives, and their superior catalytic performances over 3D ZIF-67 are demonstrated.