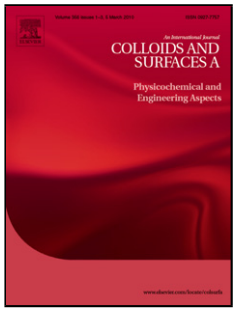

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Facile modification of NH_2-MIL-125(Ti) to enhance water stability for efficient adsorptive removal of crystal violet from aqueous solution

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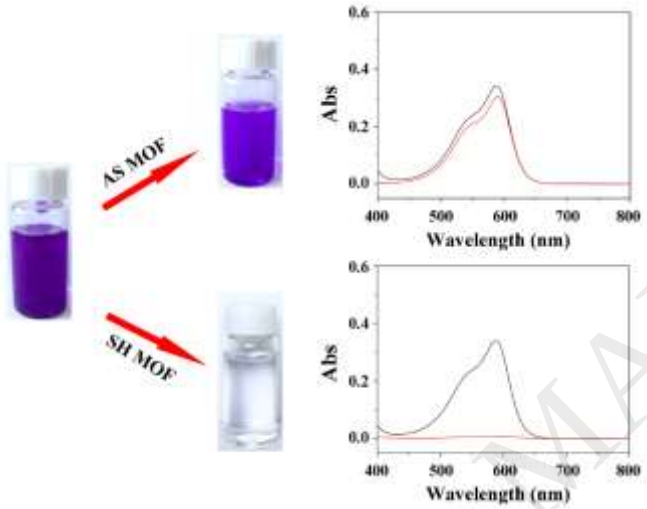
Graphical abstract



In this work, we contributed a facile method to impact superhydrophobicity on water sensitive NH_2-MIL-125(Ti) as demonstrated by chemically coating the exterior of MOF crystals with PDMS and detect its mechanism of dye adsorption.

Abstract

Metal-organic framework (MOF) has attracted much attention due to the large pore volumes and high inner surface area, those properties of which can be applied in gas storage, catalysis and liquid phase adsorption. However, the stability of most MOF will become fragile when exposed to water, yielding a critical issue for their practical applications. Therefore, postsynthetic modification on water sensitive MOF is particularly indispensable. Here, we contribute a facile method to impact superhydrophobicity on water sensitive NH_2-MIL-125(Ti) as demonstrated by chemically coating the exterior of MOF crystals with PDMS and detect its mechanism of dye adsorption. The MOF crystals exhibit superhydrophobicity (CA = 151 ± 2°) in addition to retaining high crystallinity and intact porosity after soaked in water for 7 days. Meaningfully, the adsorption capacity with 129.87 mg/g of modified MOF are much higher than initial MOF in dye adsorption. Additionally, The experimental data fit very well to Langmuir isotherm and adsorption preudo-second-order kinetic model.