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Facile Fabrication of Robust MOF Membranes on Cloth via a CMC Macromolecule Bridge for Highly Efficient Pb(II) Removal

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Abstract: Developing highly uniform and compact Metal-organic frameworks (MOFs) membranes grown on flexible substrate such as cloth for highly efficient heavy metal removal is an appealing yet challenging task. Herein, we demonstrate a facile route to rapidly in situ synthesize Zn/Co-ZIF crystals onto cloth to form robust and compact MOF membranes at room temperature. Carboxymethylcellulose sodium (CMC) is introduced to act as a macromolecule bridge to promote the chemical surface attachment of Zn/Co-Zeolite Imidazolate Frameworks (Zn/Co-ZIF) crystals while simultaneously impeding solution-phase crystal agglomeration. SEM, XRD and FT-IR spectra were used to characterize the CMC-MOF/Cloth composite membranes. Benefiting from the intrinsic properties of Zn/Co-ZIF, the CMC-MOF/Cloth shows remarkable selectivity and excellent adsorption capacity (862.44 mg g⁻¹) toward Pb(II). Detailed adsorption behaviour and mechanism are

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