New and Simple Synthetic Strategy for 2D Ultra-microporous Aromatic Framework for Selective Uranium Capture in Liquid

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Abstract

Economical uranium adsorption from seawater remains a crucial task for energy and environmental safety. Aiming for improving the mass transfer rate of uranium adsorption. Herein, a novel 2D porous aromatic framework(PAF) based on nucleophilic substitution of 2,5-dichloro benzonitrile was synthesized, with an ordered prous structure, excellent stability and selectivity of uranium extraction from seawater. PAF shows excellent uranium adsorption capacity of 637 mg/g and 3.22 mg/g in simulated and real seawater because of highly accessible pores on the walls of open channels. In addition, benefiting from the super-hydrophilicity due to the presence of amidoxime groups attributes high selectivity and ultrafast kinetics with an uptake rate of 0.43±0.03 mg/g.day and allowing half-saturation within 1.35±0.09 day. This strategy demonstrates a potential of PAF not only in uranium trap but also possess a power to monitor water quality. This technique can be extended in other applications by sensible planning target ligands

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