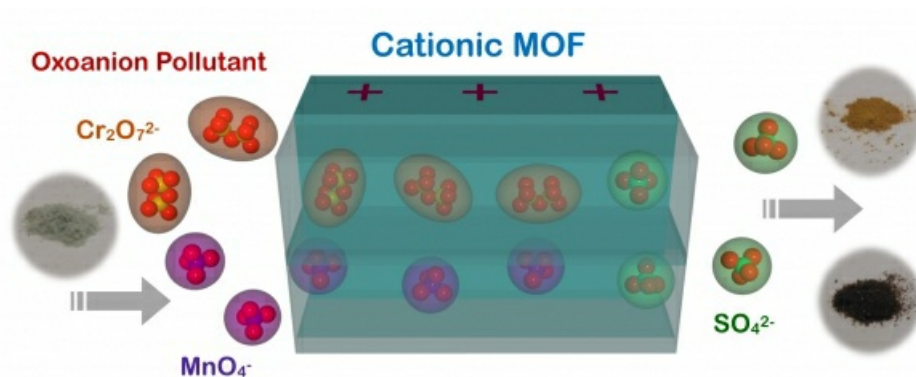


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A rational design strategy has been employed for the synthesis of an uncommon example of a water-stable cationic metal-organic framework (MOF).[1] The MOF (1-SO₄) is built on a tripodal neutral ligand and is held by Ni(II) nodes. The cationic framework bears the presence of aligned arrangement of free sulphate (SO₄²⁻) which has been tapped for the function of aqueous phase ion-exchange. The stability of the compound has been utilized for the aqueous phase detection via capture of the environmentally hazardous inorganic pollutants viz. oxoanions of heavy-metals like dichromate (Cr₂O₇²⁻) and permanganate (MnO₄⁻). Most of these inorganic pollutants, which are most commonly present in the form of oxoanions in water streams, have been marked as priority pollutants in the list formulated by Environment Protection Agency (EPA). We hypothesized that the tetrahedral geometry of the free sulphate ions could facilitate uptake of like shaped dichromate and permanganate ions, with the latter as a congener for the more toxic and radioactive pertechnetate ions (TcO₄⁻). A naked-eye colorimetric change was observed for both cases which found to be selective in presence of some of the common ions found in water streams such as NO₃⁻, ClO₄⁻, BF₄⁻, CF₃SO₃⁻. The uptake capacity for dichromate was calculated to be 166 mg·g⁻¹, which is among the best known values for MOF-based compounds. This was found to be the first example wherein MOF was found to be suitable for the capture of both permanganate (as a model for TcO₄⁻) and dichromate in the aqueous phase.

[1] Desai, A. V. et al. (2016). *Angew. Chem. Int. Ed.*, 55, 7811-7815.



Keywords: [Metal-Organic Framework](#), [Oxoanion](#), [Ion-exchange](#)