

Cation-controlled wetting properties of vermiculite membranes and its promise for fouling resistant oil–water separation

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Abstract

Oil/water separation has attracted great interest as it has direct practical application for resolving the problem of industrial oily wastewater¹⁻⁴. Therefore, the development of novel materials for efficient oil-water polluted waste treatment is imperative. Engineering surface chemistry to precisely control interfacial interactions for fabricating superior antifouling separation membranes is important. Here we present super wetting surface, lithium-exchanged vermiculite laminate. We find that vermiculite laminates can be tuned from superhydrophilic to hydrophobic by exchanging the cations on the surface and in the interlamellar space; hydrophilicity decreases with increasing cation hydration free energy, except for lithium. Based on these findings we address a major challenge for oil–water separation technology.

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