

Abstract Submitted
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A novel selective lithium separation using amorphous pMOF/alginate interfaces¹ SUNG HO PARK, SANG JOON LEE, Pohang University of Science and Technology — Anomalous opposite ion behaviors of Li^+ and Mg^{2+} ions are experimentally observed from amorphous interfaces of phosphonate metal–organic framework (pMOF)/alginate composites. The amorphous structures of pMOF/alginate composites are significantly varied according to reaction temperature and intertwinement degree of alginate networks. As a proof-of-concept application, Li^+ and Mg^{2+} ions are separated using pMOF/alginate composite depending on the degree of pMOF growth. Initially, lots of Li^+ ions are effectively attracted compared to Mg^{2+} ions due to the strong repulsion force of Al^{3+} ions in amorphous alginate interfaces on multi valent metal ions. However, amorphous pMOF/alginate interfaces induce effective rejection of Li^+ ions with low hydration energy through dehydration due to the significant interaction with water molecules, while Mg^{2+} ions with high hydration energy are significantly attracted by negatively charged phosphonate groups. The present results of amorphous MOF/alginate interfaces would provide a variety of benefiting separation opportunities with unique property in seawater desalination and rare metal recovery.

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