Supplementary Information

Fabrication of hierarchically porous monolithic layered double hydroxide composites with tunable microcages for effective oxyanion adsorption

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Supplementary Figures

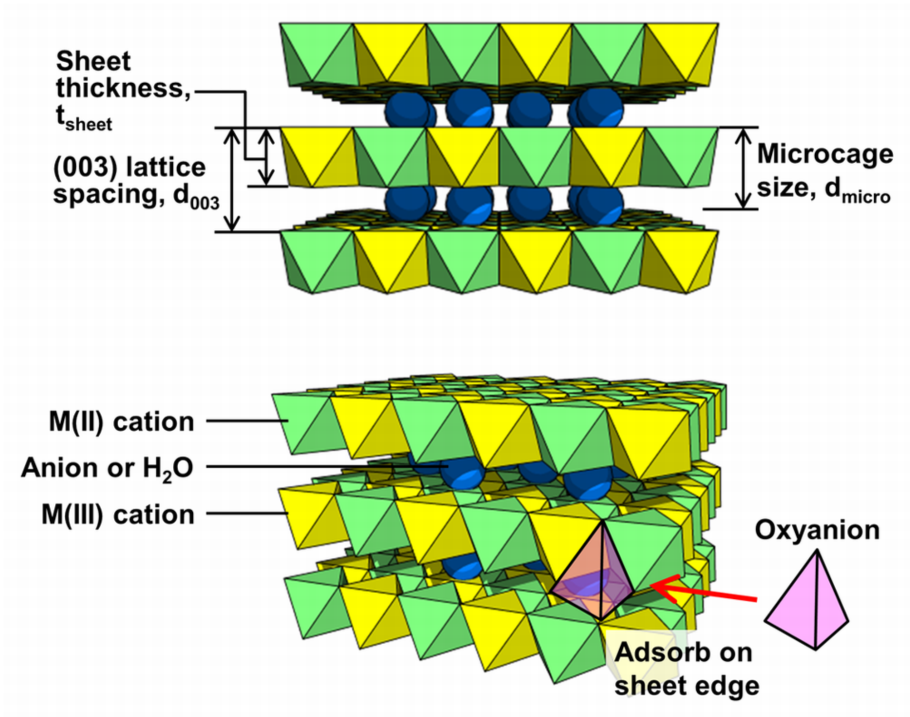

Figure S1. Schematic illustration of LDH crystal. Upper image shows microcage size, d_{micro}, which is calculated from hydroxide sheet thickness, t_{sheet}, and (003) lattice spacing, d_{003}, as follows; $d_{micro} = t_{sheet} + (d_{003} - t_{sheet})/2$. t_{sheet} is 200 pm[1] and d_{003} is estimated from the XRD pattern. The lower image shows adsorption of an oxyanion, in which the oxyanion fits into a microcage formed between adjacent octahedral metal hydroxides.

Reference

[1] Y. Wang and H. Gao, *J. Colloid Interf. Sci.*, 2006, **301**, 19.

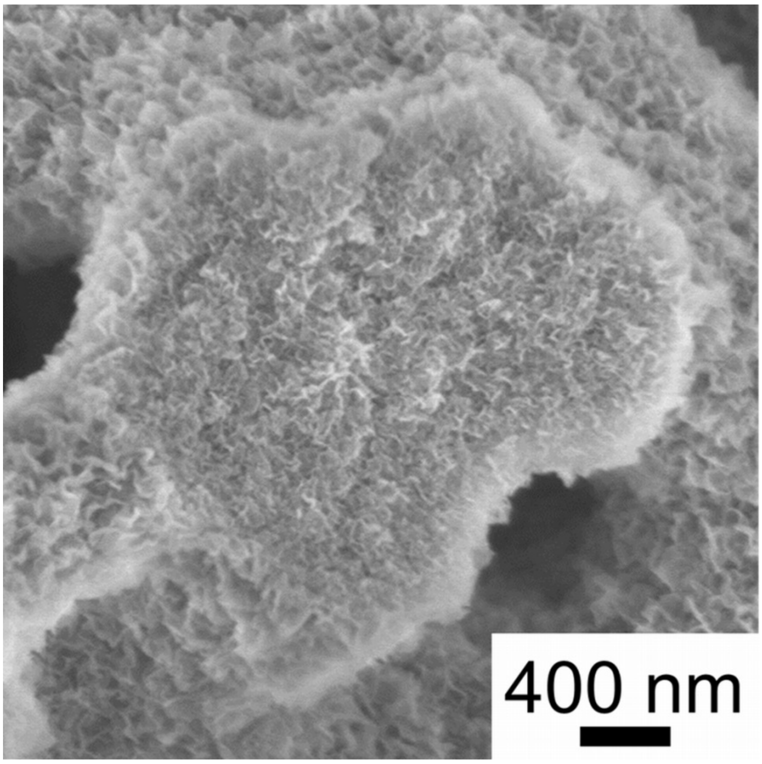

Figure S2. Magnified SEM image of Figure 1 (b).

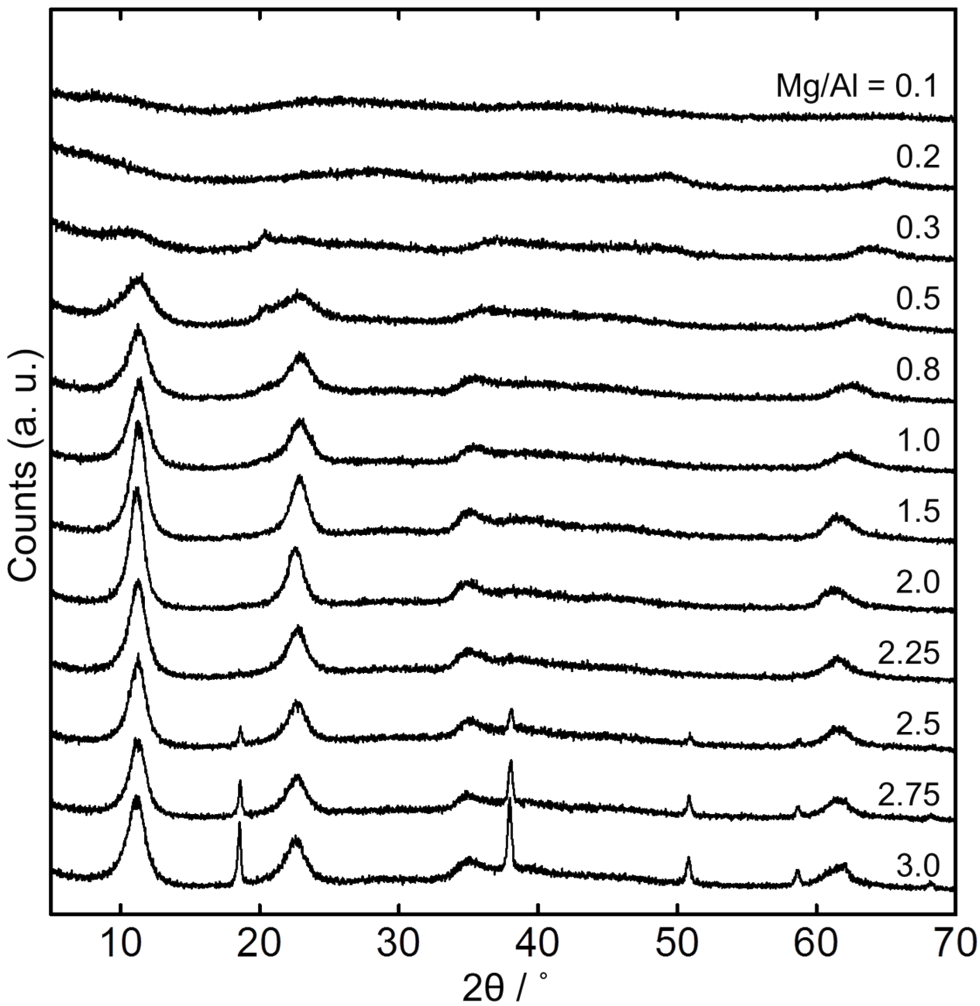

Figure S3. XRD patterns of Mg-Al type LDH monolithic composites prepared with various Mg/Al molar ratios from 0.1 to 3.0.

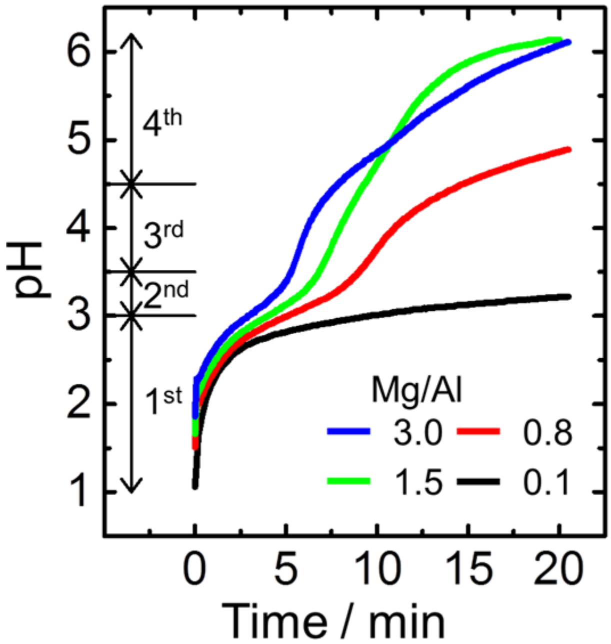

Figure S4. Time evolutions of solution pH after PO addition in Mg-Al system. In the curves, pH rapidly increased to about 3.0 within several minutes (1^{st} stage), showed a plateau (2^{nd} stage, formation of $Al(OH)_3$), rapidly increased again (3^{rd} stage), and then showed a gradual increase (4^{th} stage, formation of LDH and/or $Mg(OH)_2$).

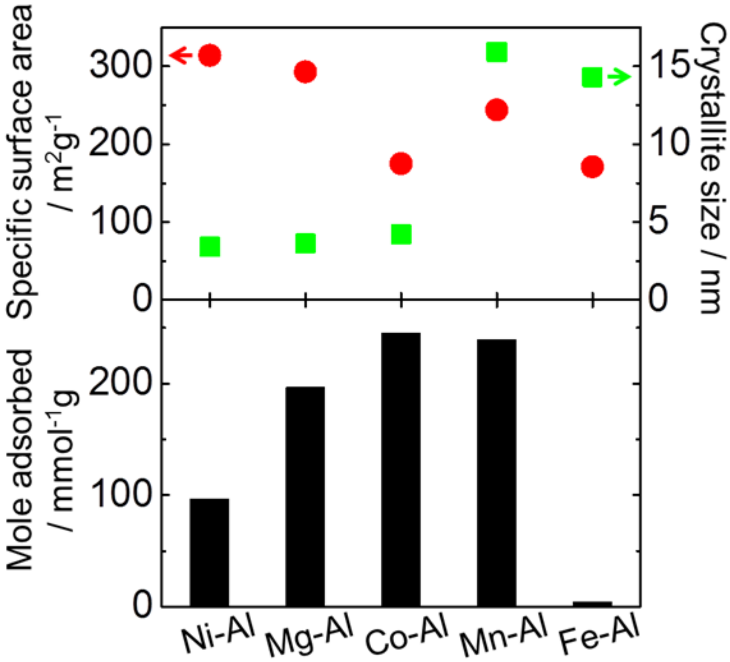

Figure S5. CrO_4^{2-} adsorption amounts, specific surface areas (red circle) and crystallite sizes (green square) of M(II)-Al type LDH composites (M(II) = Mg, Mn, Fe, Co, and Ni).