

### Amphiphilic graft copolymer-templating fabrication of mesoporous aluminum oxides and CO<sub>2</sub> capturing ability

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Mesoporous aluminas were prepared via a sol-gel process by using an amphiphilic graft copolymer as a structure-directing agent, PVC-*g*-POEM, consisting of a poly(vinyl chloride) (PVC) backbone and poly(oxyethylene methacrylate) (POEM) side chains. The mesoporous morphologies of aluminas with large surface areas were confirmed by X-ray diffraction (XRD), transmission electron microscopy (TEM) and nitrogen adsorption/desorption analysis. Aluminas synthesized with PVC-*g*-POEM graft copolymer exhibited higher CO<sub>2</sub> capturing ability (0.7 mol CO<sub>2</sub>/kg sorbent) than aluminas synthesized without graft copolymer (0.6 mol CO<sub>2</sub>/kg sorbent). The adsorption capacity of alumina strongly depends on its structure and calcination temperature; amorphous (400 °C) > γ phase (800 °C) > α phase (1000 °C).