Supporting Information

SU-75: A Disordered Ge$_{10}$ Germanate with the pcu Topology

Shiliang Huang,$^{a,\#}$ A. Ken Inge,$^{a,\#}$ Sihai Yang,$^{b}$ Kirsten E. Christensen,$^{c}$ Xiaodong Zou,$^{a,*}$ and Junliang Sun$^{a,*}$

$^{a}$ Department of Materials and Environmental Chemistry and Berzelii Center EXSELENT on Porous Materials, Stockholm University, SE-10691 Stockholm, Sweden

$^{b}$ School of Chemistry, The University of Nottingham, Nottingham NG7 2RD, United Kingdom

$^{c}$ Diamond Light Source Ltd, Diamond House, Harwell Science and Innovation Campus, Dicot, Oxfordshire, OX11 0DE, United Kingdom

Contents

Figure S1 SEM images of SU-75.
Figure S2 Experimental powder X-ray diffraction (XRD) pattern of SU-75(dab).
Figure S3 Thermogravimetric analysis of SU-75(dien).
Figure S4 Powder XRD patterns of SU-75(dien) before and after ion-exchanging.
Figure S5 Different choices of SBU in Ge$_{10}$ germanate.
Figure S6 In-situ powder XRD patterns of SU-75(dien).
Figure S7 In-situ powder XRD patterns of LNM-1 (Ge-pharmacosiderite).
**Figure S1** SEM images of SU-75. (a) The crystals synthesized with diethylenetriamine (dien) as the structure directing agent; (b) The crystals synthesized with diaminebutane (dab) as the structure directing agent.

**Figure S2** The experimental powder XRD pattern of SU-75(dab) compared to the simulated powder XRD pattern.
**Figure S3** Thermogravimetric curve of SU-75(dien) performed in N$_2$ flow from 50 to 700 °C at a heating rate of 5 °C/min. The total weight loss of 22.3% between 50°C and 700°C was attributed to the loss of water and the dien molecules. The content of water and dien molecules calculated from the chemical formula 21.6 w.t% ($n=5$) or 22.8 w.t% ($n=6$), which is consistent with the TGA result.
**Figure S4** Powder XRD patterns of SU-75(dien) before and after ion-exchanging. The framework was kept after 50% of SDAs were exchanged by Na\(^+\) or K\(^+\).

**Figure S5** Different secondary building units (SBUs) used for describing the Ge\(_{10}\) germanates. (a) The Ge\(_{10}\) cluster in SU-75, (b) a Ge\(_5\) building unit in LNM-1 and (c) a Ge\(_8\) building unit in IM-14.
**Figure S6** *In-situ* powder XRD patterns for SU-75. SU-75 was stable up to 50 °C before the crystallinity started to degrade.

**Figure S7** *In-situ* powder XRD patterns for LNM-1 (Ge-pharmacosiderite). LNM-1 was stable up to 250 °C.