Supporting Information for

Hydrogen Storage and Selective Carbon Dioxide Capture in a New Chromium(III)-Based Infinite Coordination Polymer

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**Figure S1.** SEM image of infinite coordination polymer particles obtained using a volume ratio of 1,4-dioxane to DMF, 25:75.

**Figure S2.** Powder XRD patterns of samples 1 and 2.
Figure S3. Infrared spectra of samples 1 and 2.

Figure S4. Solid-state UV-Vis spectra of samples 1 and 2.
**Figure S5.** TG profiles of samples 1 and 2 (heating rate: 10 °C min⁻¹ in air flow).

**Figure S6.** High-pressure hydrogen adsorption isotherms for samples 1 (squares), and 2 (circles) at 77 K over a pressure range of 0-33 atm. In the isotherms, solid and open markers represent adsorption and desorption points, respectively.
Figure S7. Low-pressure hydrogen adsorption isotherms for samples 1, 1', 2 and 2' at 80 K (squares), 85 K (circles) and 90 K (triangles).

Figure S8. Low-pressure CO₂ adsorption isotherms for samples 1, 1', 2 and 2' at 295 K.
**Figure S9.** Low-pressure CH$_4$ adsorption isotherms for samples 1, 1', 2 and 2' at 296 K.