Supporting Information for:

Thermodynamic Complexity of Carbon Capture in Alkylamine-Functionalized Metal-Organic Frameworks

Di Wu*, Thomas M. McDonaldb, Zewei Quanc, Sergey V. Ushakov*, Peng Zhanged, Jeffrey R. Longb and Alexandra Navrotsky*a

aPeter A. Rock Thermochemistry Laboratory and NEAT ORU, University of California, Davis, California, 95616, USA

bDepartment of Chemistry, University of California, Berkeley, California, 94720, USA

cEarth and Environmental Sciences Division, Los Alamos National Laboratory, Los Alamos, New Mexico, 87545, USA

dSchool of Materials Science and Engineering, State Key Laboratory for Metallic Matrix Composite Materials, Shanghai Jiao Tong University, Shanghai, 200240, China

*Corresponding author email: anavrotsky@ucdavis.edu
S1. Preparation of mmen-Mg$_2$(dobpdc)

mmen-Mg$_2$(dobpdc) sample was prepared at UC Berkeley according to the method used by McDonald et al. The synthesis and activation details were described elsewhere. Post activation sample was kept in a nitrogen-filled glovebox to keep away from air.

![Figure S1](image.png)

**Figure S1.** Triplicated differential enthalpy of CO$_2$ adsorption curves at **a)** 298 (blue), **b)** 323 (purple) and **c)** 348 K (red) on the same mmen-Mg$_2$(dobpdc) sample. **d)** differential enthalpies of CO$_2$ adsorption at 298 K on the mmen-Mg$_2$(dobpdc) sample with major chemisorption on the plateau range inhibited (green).

**References**