

Supplementary Information

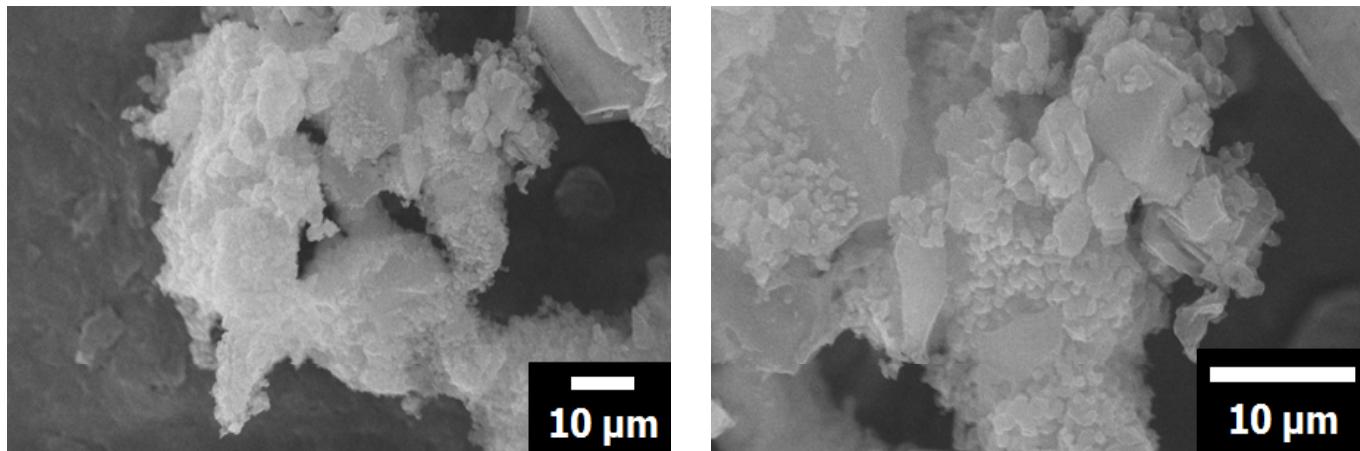


Figure S1. SEM micrographs of HKUST-1 seed crystals showing crystals of various sizes

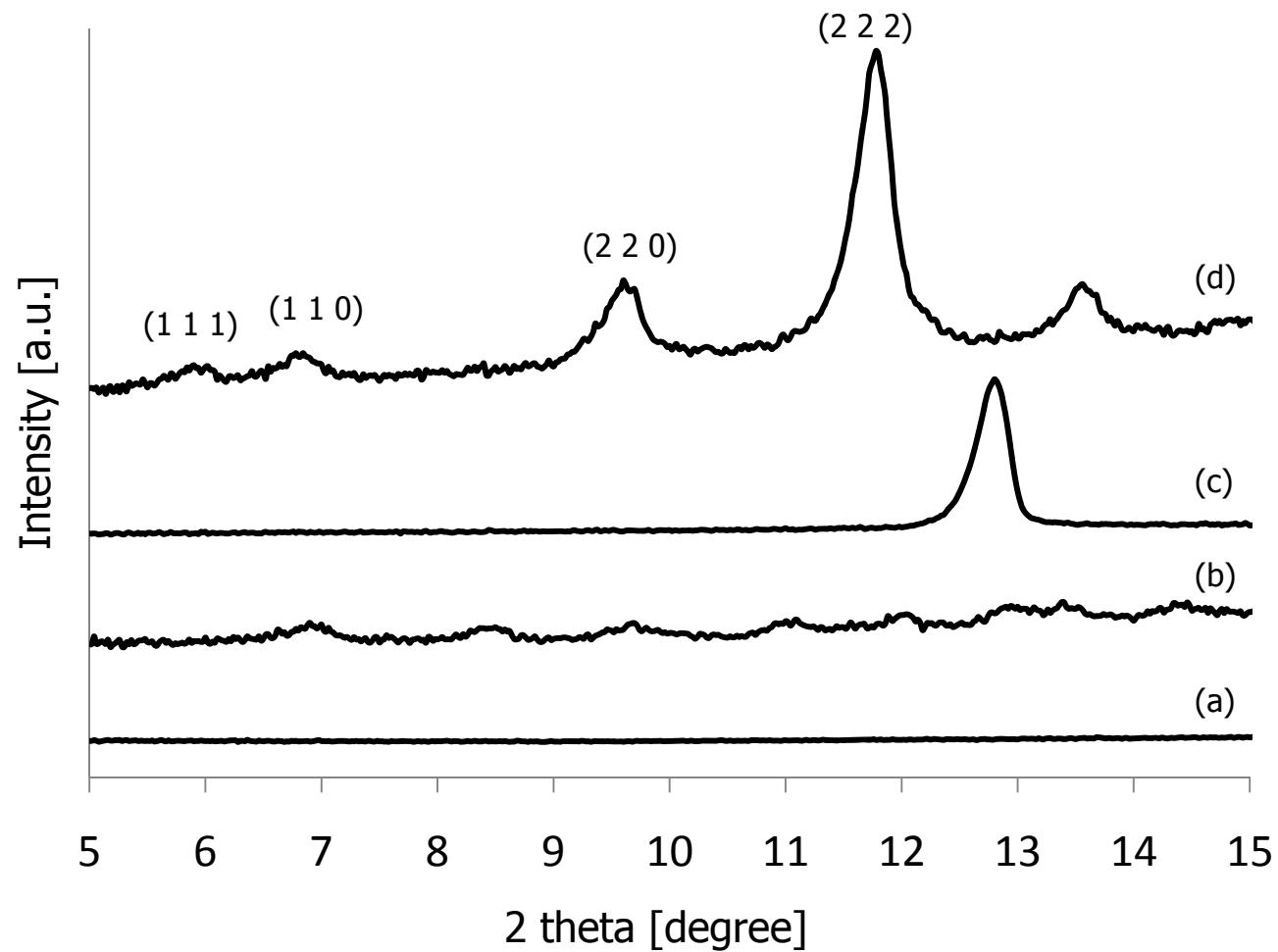


Figure S2. XRD patterns of the seeded supports using re-dispersed HKUST-1 samples in water/ethanol mixture containing (a) neither ligands nor copper salts, (b) only ligands (SSHT_L), (c) only copper salts (SSHT_C), and (d) both ligands and salts (SSHT_LC)

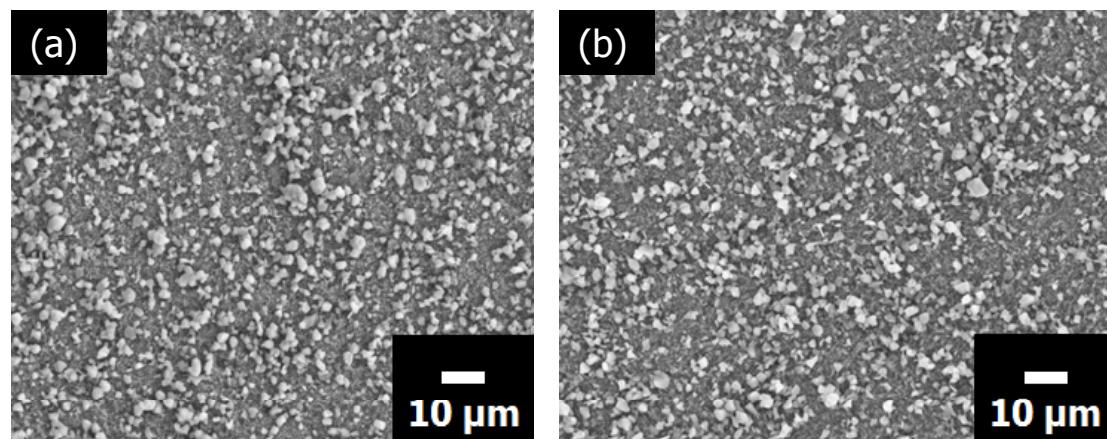


Figure S3. SEM micrographs of the samples grown from (a) the seeded support at RT (SSRT_S) and (b) the bare α -alumina support *in situ*

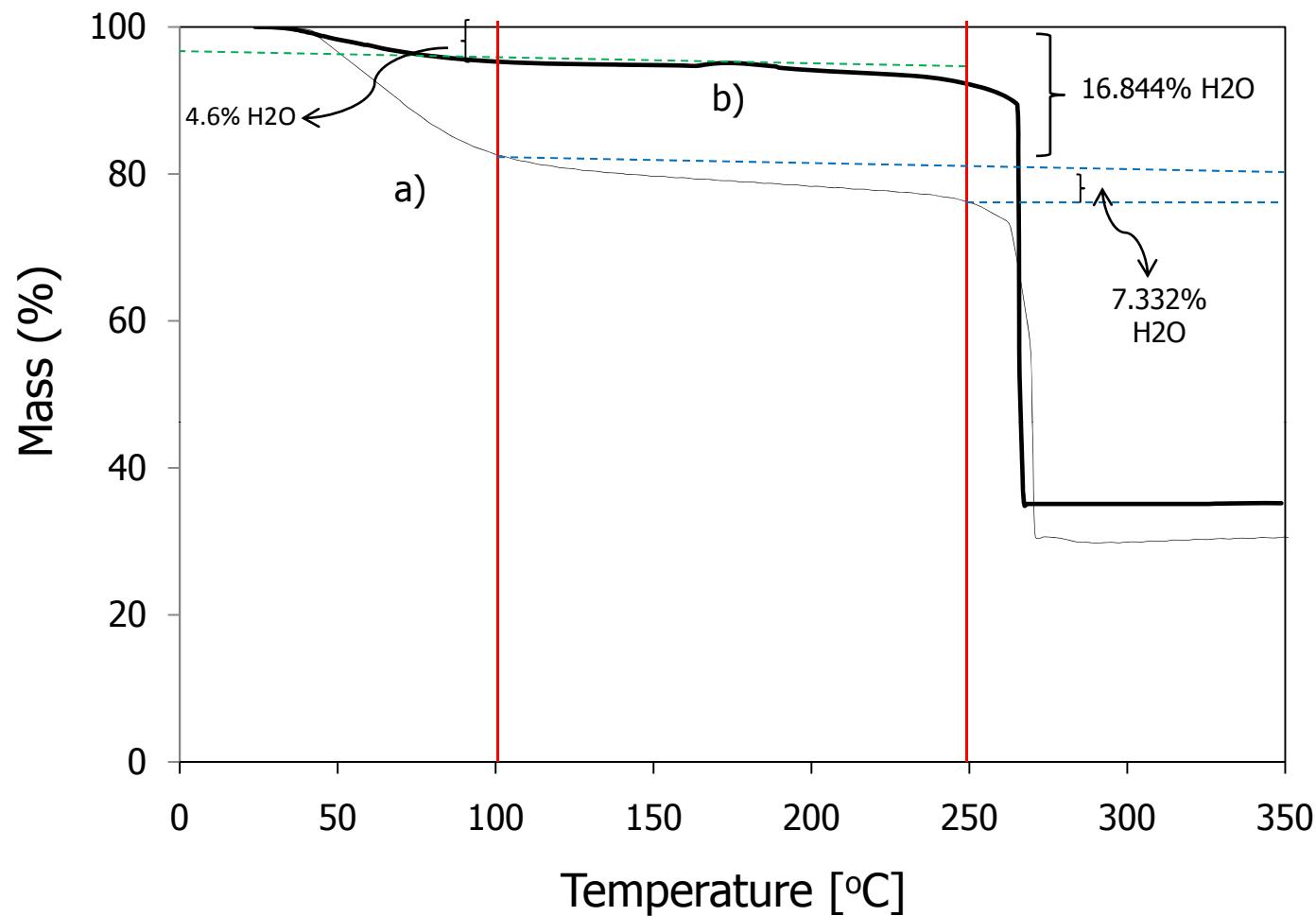


Figure S4. Thermal gravimetric analysis of the samples partially dried for 3 days (a) at 40 °C under nearly saturated condition and b) after being subjected to the permeation test condition (i.e., flush with dry He under vacuum at different temperatures)

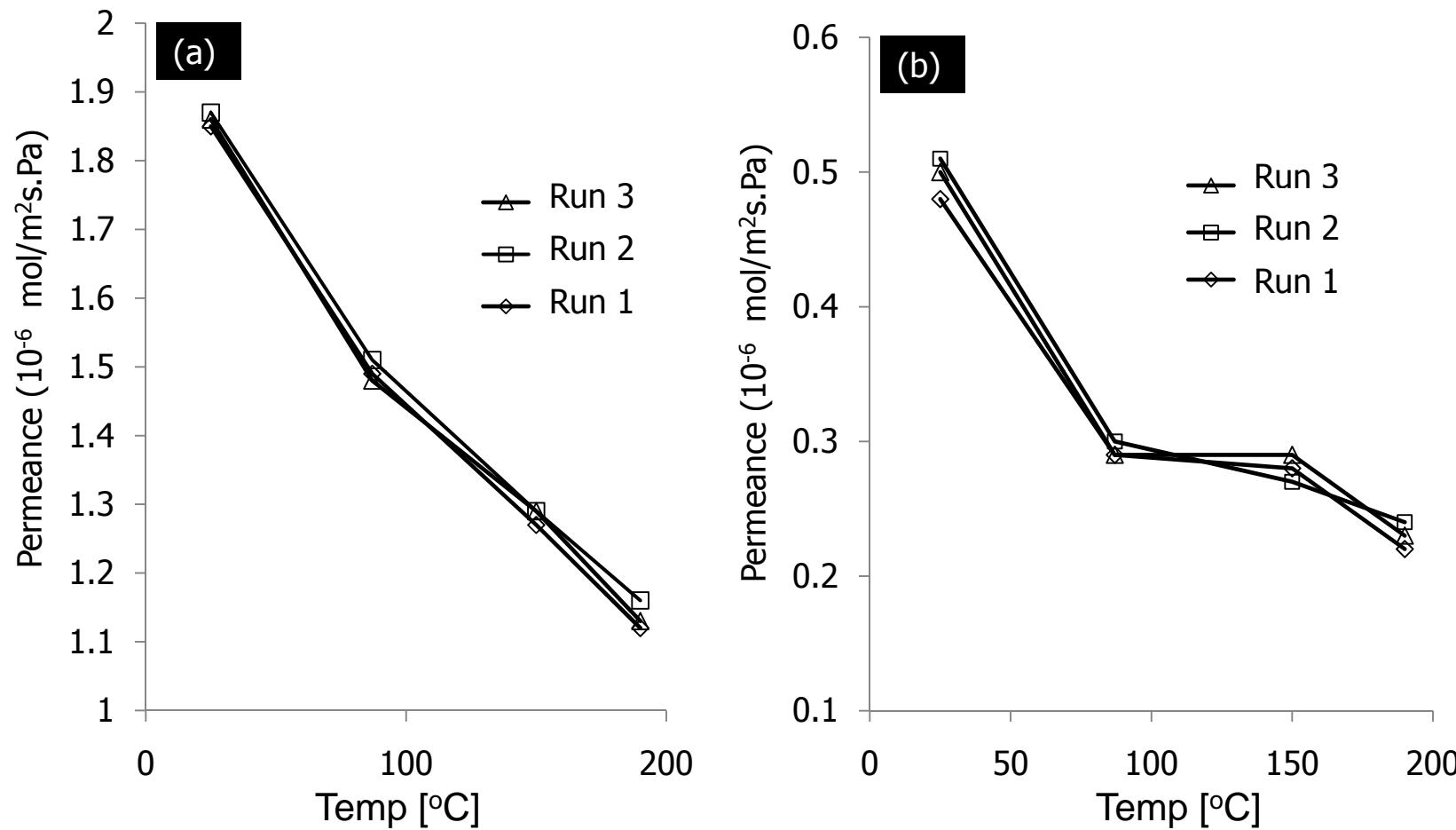


Figure S5. H₂ (a) and CO₂ (b) permeation results of the membrane samples tested as temperature increases. After each run, the samples were brought back to room temperature and flushed with dry He and tested at different temperatures.