Supporting Information

Growth of Zeolitic Imidazolate Framework-8 crystals from the Solid-liquid Interface

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Characterization Details

XRD patterns were collected directly on the film (layer) grown from the foil using a Bruker D8-Discover diffractometer at 40 kV, 40mA with Cu Kα radiation. The morphology was inspected using FE-SEM (FEI Nova 600) with an acceleration voltage of 6 kV. Transmission electron microscopy (TEM) studies, including TEM and STEM imaging, selected area electron diffraction (SAED), and energy-dispersive X-ray spectroscopy (EDS), were performed using a FEI Tecnai F20 transmission electron microscope equipped with a field emission gun and operating at the accelerating voltage of 200 keV. TEM specimens were prepared by dispersing the samples onto holey carbon-coated copper TEM grids. ZIFs are highly susceptible to the electron beam damage. Therefore, the TEM analysis, especially SAED studies, were performed under the low-dose illumination conditions (i.e. highly diverged beam with increased spot size corresponding to low beam current density). STEM imaging and EDS analysis were performed in the nanoprobe mode using the 1 nm probe.

Figure S1. 250 ml stainless steel high pressure Parr reactor (Model 4576A) employed in the synthesis of ZIF-8 crystals from zinc foils.

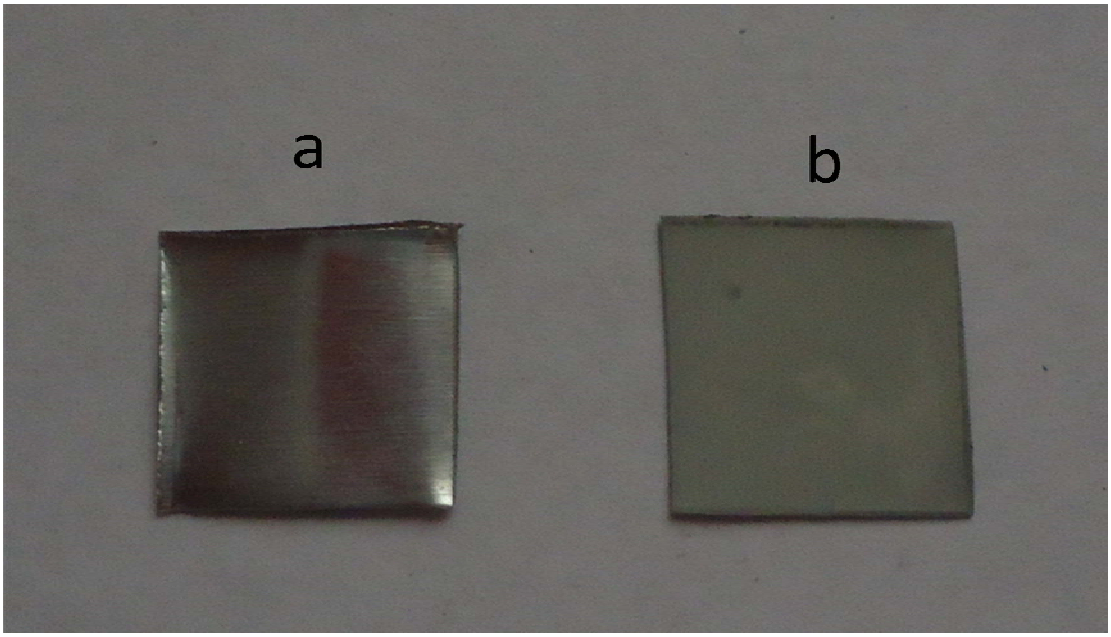

Figure S2. a) Zinc foil employed in the synthesis of ZIF-8 crystals, b) Representative ZIF-8 film grown from the zinc foil.

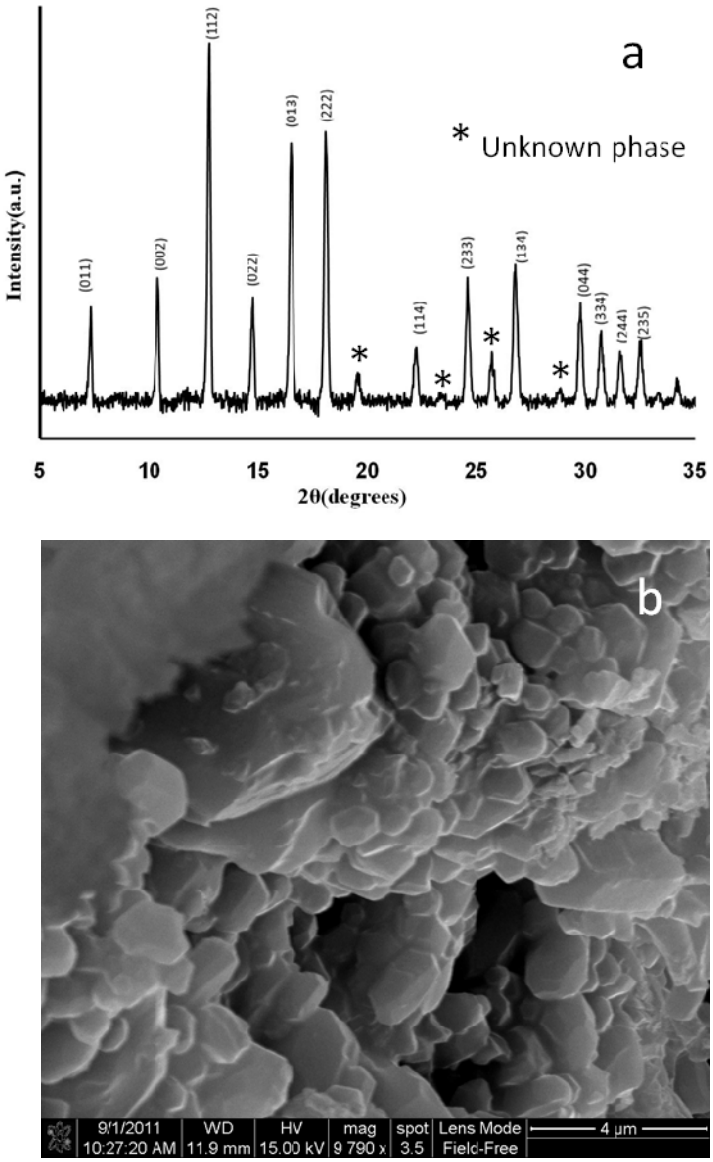

Figure S3. a) XRD and b) representative SEM of a ZIF-8 sample synthesized with 2-propanol as solvent, in the absence of H_2. Synthesis was conducted for 5 hr. XRD shows the formation of ZIF-8 phase and a secondary phase.

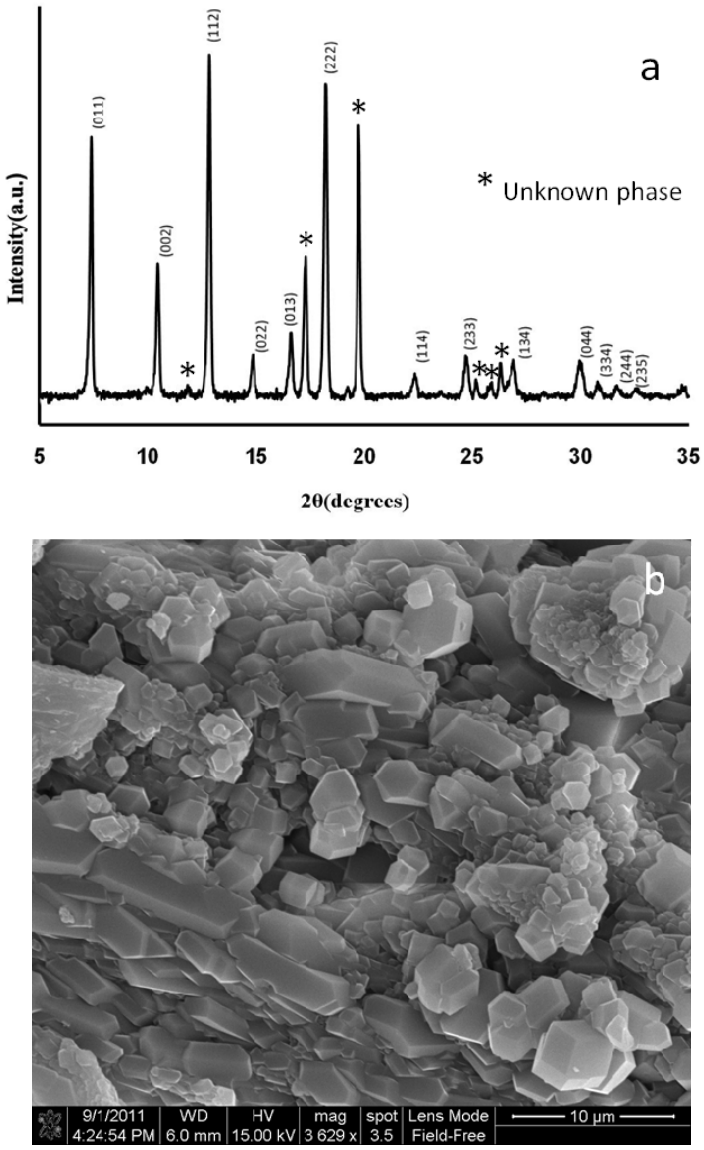

Figure S4. a) XRD and b) representative SEM of a ZIF-8 sample synthesized with methanol as solvent. Synthesis was conducted a teflon lined Parr stainless steel autoclave at 150^{o}C for 4 days. XRD shows the formation of ZIF-8 phase and a secondary phase.

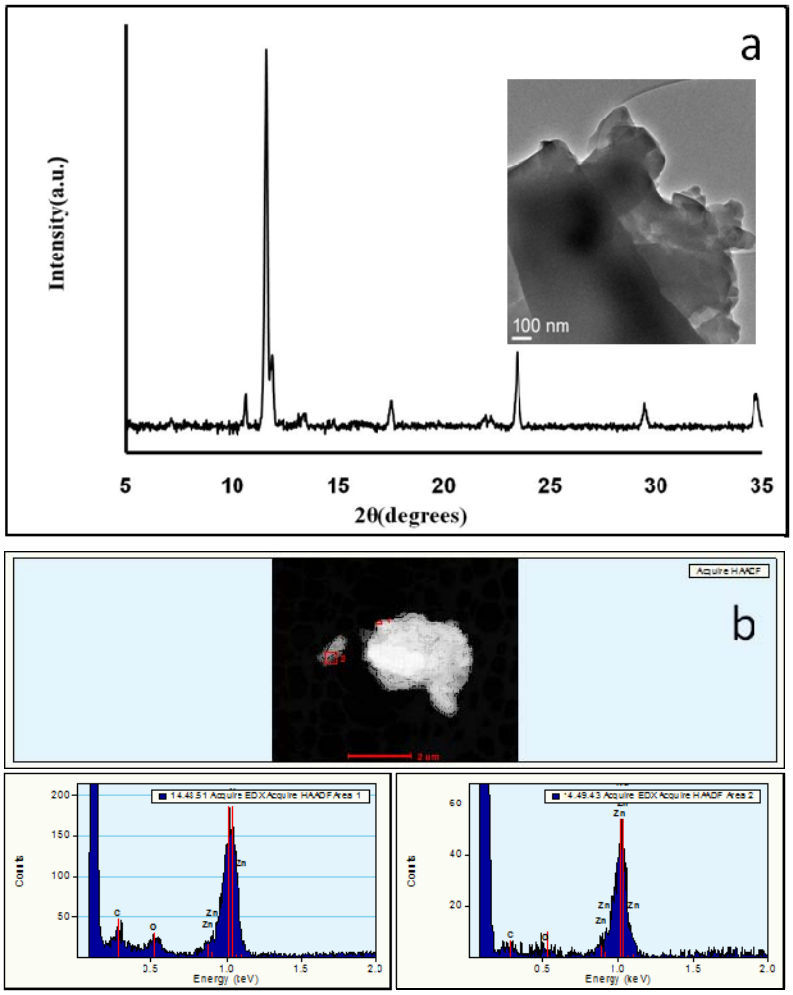

Figure S5. a) XRD and TEM (inset) and b) EDS of a sample synthesized with 2-propanol as solvent at pH=4.8. Synthesis was conducted under H_2 at 100 psia for 5 hr. XRD and EDS suggest the formation of layered $Zn(OH)_2$.

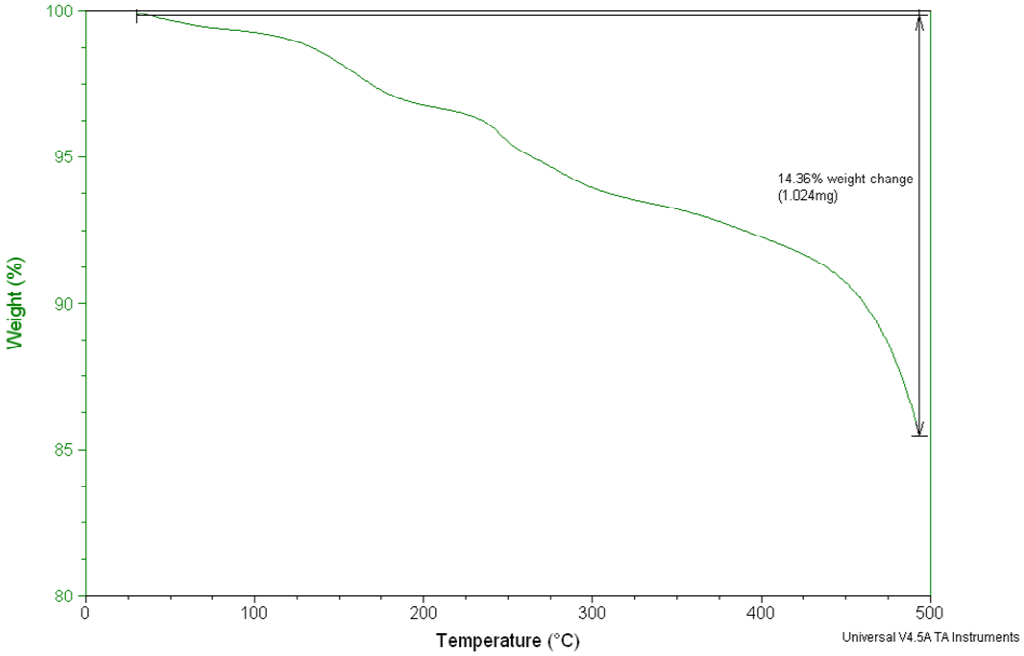

Figure S6. TGA analysis on the ZIF-8 crystals (air flow)

The TGA analysis under air shows a weight loss of ~3.5% at temperature of ~200 °C. This region has been associated with the released of guest molecules and some unreacted linker species (see for example: Y.Pan, Z. Lai, *Chem. Commun*. 2011, 47, 10275).The following two mass losses can be attributed to the removal of the organic linker molecules. Therefore the synthesized ZIF-8 crystals are stable up to ~200°C.