Supporting Information for:

Adsorption properties in high optical quality nanoZIF-8 thin films with tunable thickness

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Characterizations of the ZIF-8 nanoparticles:

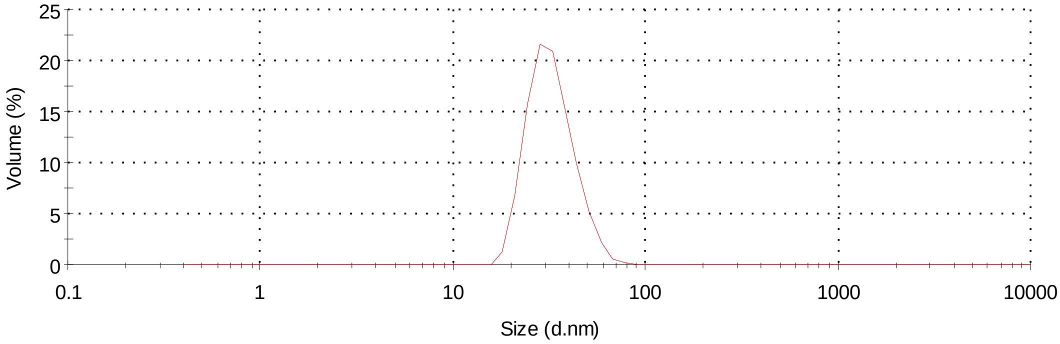

Fig. S1 Dynamic Light Scattering size distribution curve of nanoparticles of ZIF-8 in absolute ethanol at 25 °C (Z-average 28 ± 15 nm, polydispersity 0.083).

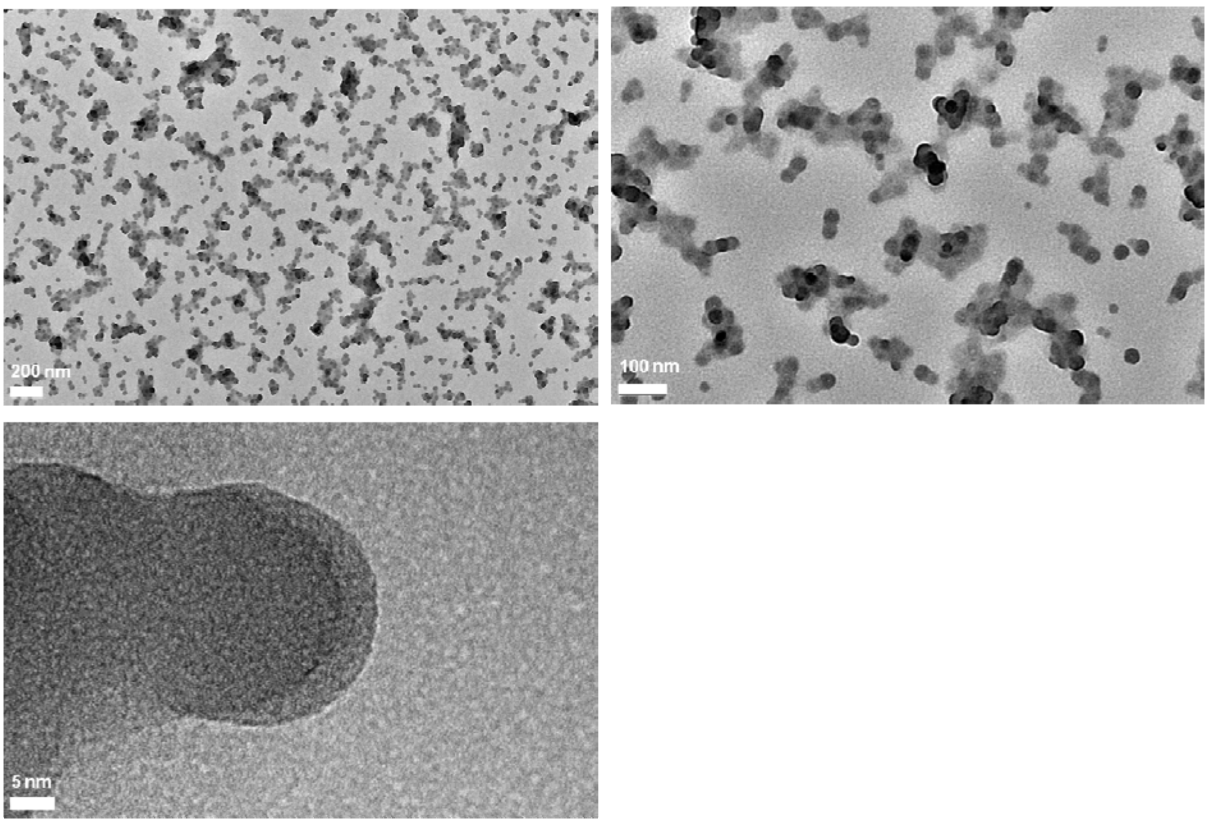

Fig. S2 TEM images of ZIF-8 nanoparticles.

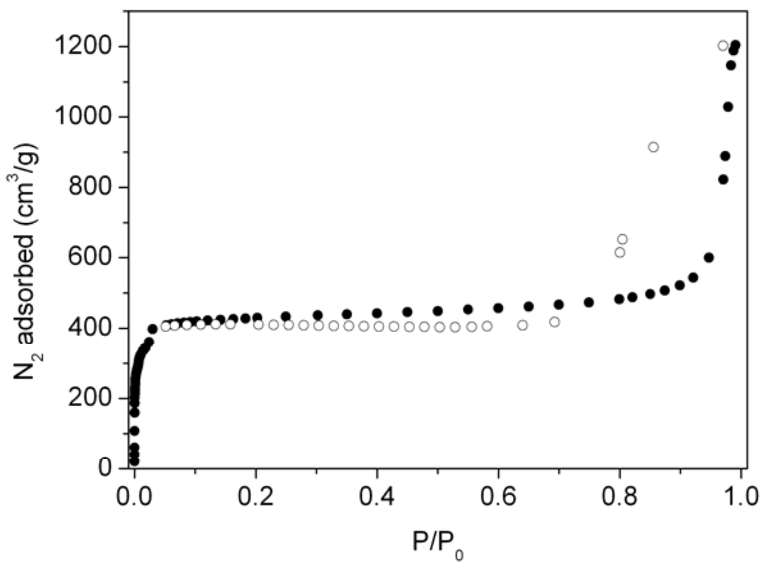

Fig. S3 N_2 adsorption/desorption isotherm at 77 K in nanoparticles of ZIF-8 activated at 120 °C for 12 h under vacuum. Surface area: 1696 ± 16 m^2/g (BET) and 1904 ± 3 m^2/g (Langmuir).

The linker and Zn metal contents were determined by heating ZIF-8 nanoparticles to 600 °C for 5 h. The final white solid residue was identified as ZnO by powder X-ray diffraction. The total amount of the 2-methylimidazolate linker and the zinc metal zinc in ZIF-8 nanoparticles correspond to 71.5 % (calcd. 71.3 %) and 27.5 % (calcd. 28.7 %), respectively.

Characterizations of the thin films:

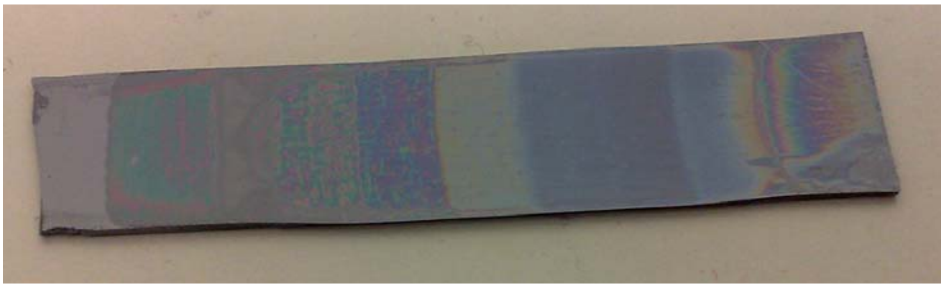

Fig. S4 Photo of a deposition of ZIF-8 NPs from a 0.2 mol.L^{-1} colloidal solution on a silicon wafer and with a gradual withdrawal speed between 0.01 mm.s^{-1} (left) to 1 mm.s^{-1} (right). The color variation of the film is dependent on the film thickness in relation to the optical interference.

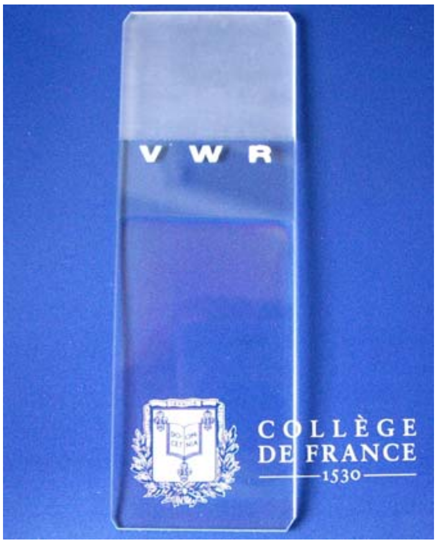

Fig. S5 Photo of a deposition of ZIF-8 NPs on a glass wafer showing the transparency of the thin film.

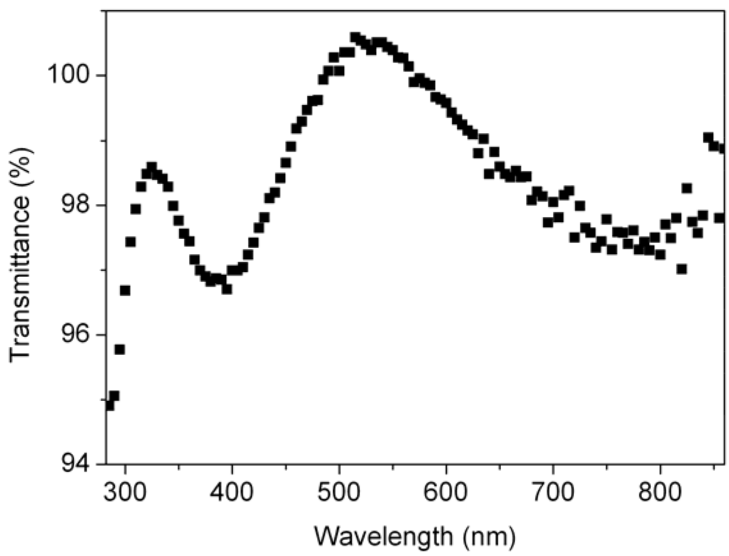

Fig S6 UV-vis transmission spectra on a thin film of ZIF-8 NPs deposited on a glass substrate. The band centered at 390 nm is the absorption of the linker. The optical transmittance > 96 % points to the high optical quality of the film.

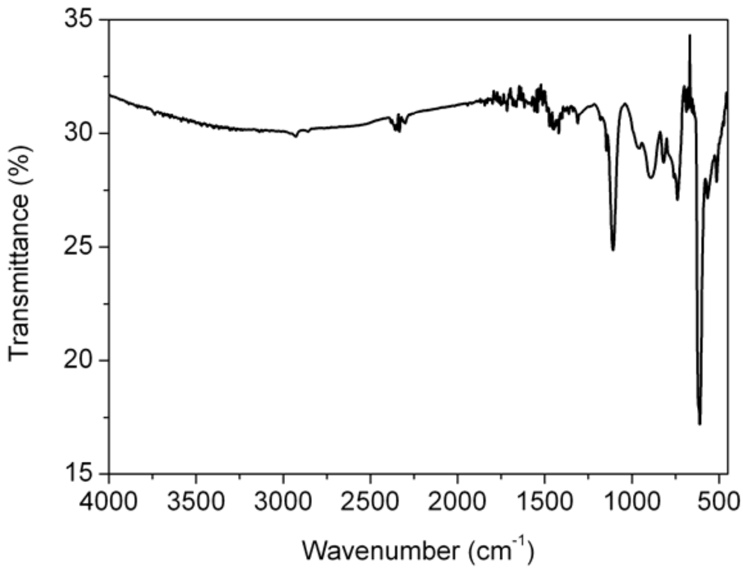

Fig. S7 ATR Infra-red spectrum of a ZIF-8 film with a thickness of 251 nm.

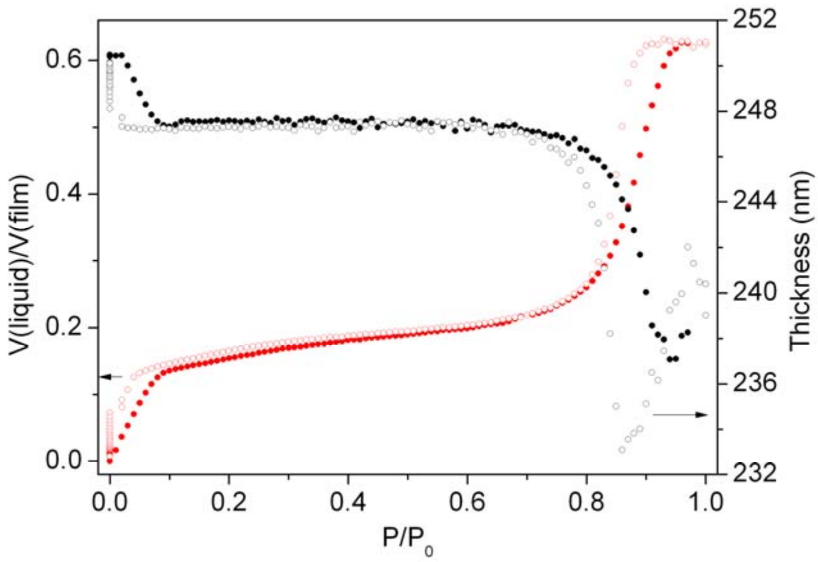

Fig. S8 Evolution of adsorbed isopopanol volume (red) and film thickness (black) from a ZIF-8 thin film made by three successive depositions at 5 mm.s^{-1} (adsorption, filled circles and desorption, open circles).

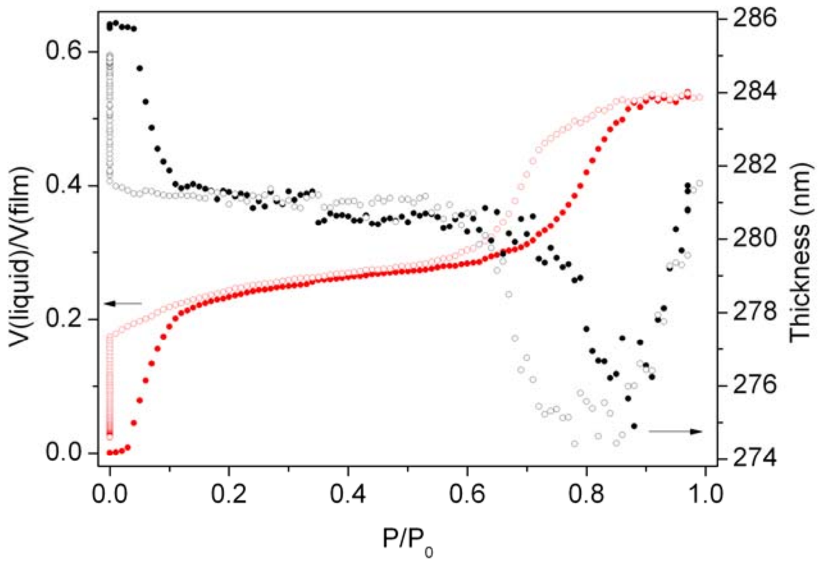

Fig. S9 Evolution of adsorbed isopopanol volume (red) and film thickness (black) from a ZIF-8 thin film made by one deposition at 0.02 mm.s^{-1} (adsorption, filled circles and desorption, open circles).

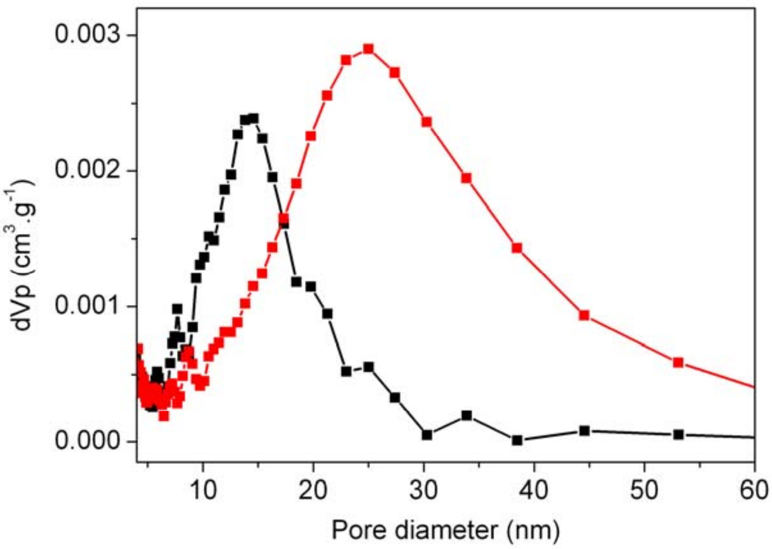

Fig. S10 Pore size distribution plots from isopropanol adsorption isotherms at room temperature from ZIF-8 thin films (Fig. S8 and S9). In black, a film made by one deposition of nanoparticles at 0.02 $mm.s^{-1}$ and in black a film with three successive depositions at 5 $mm.s^{-1}$. The plots show the existence of a maximum centred at a pore diameter of 14 nm and 25 nm.

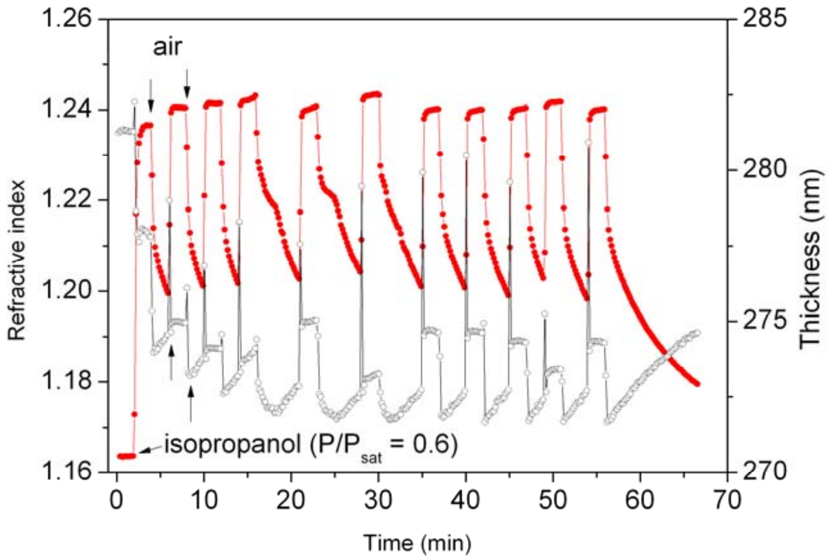

Fig. S11 Evolution of refractive index (red) and film thickness (black) exposed to isopropanol vapors cycling through ellipsometric measurements on a ZIF-8 thin film at 25 °C (flow of P/Pvapsat = 0.6 of isopropanol in air followed by a flow of pure air).

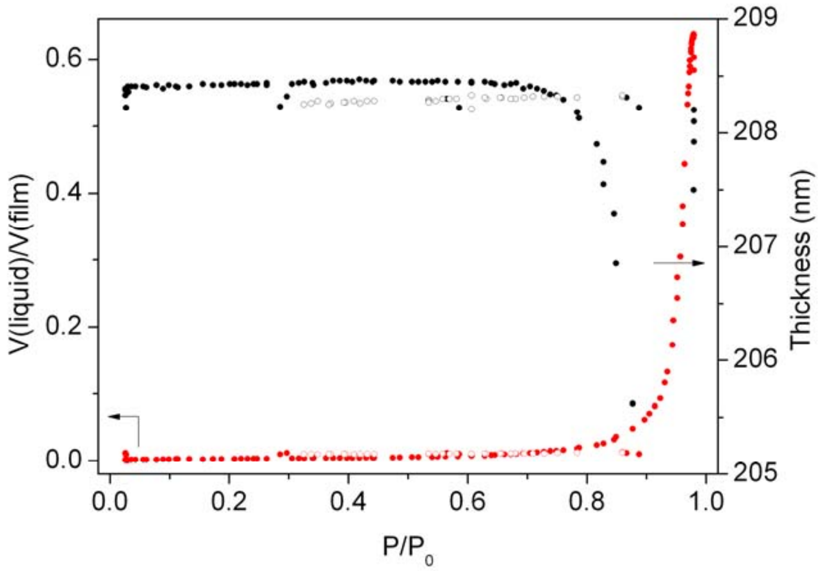

Fig. S12 Evolution of adsorbed water volume (red) and film thickness (black) from a ZIF-8 thin film made by one deposition (adsorption, filled circles and desorption, open circles).

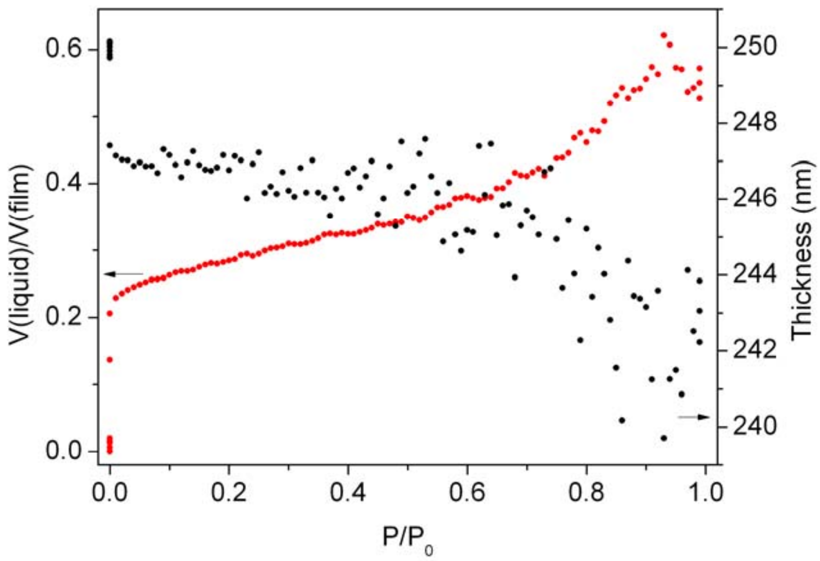

Fig. S13 Evolution of adsorbed THF volume (red) and film thickness (black) from a ZIF-8 thin film made by one deposition (adsorption, filled circles and desorption, open circles).

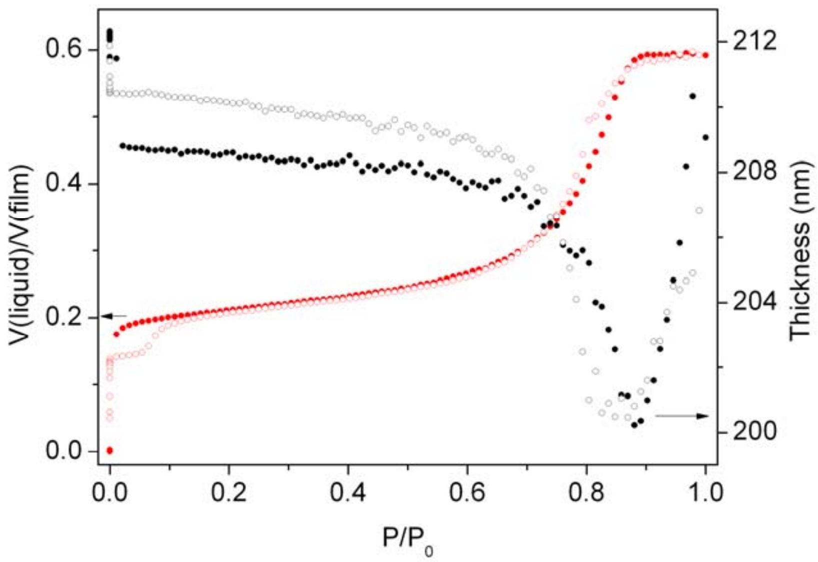

Fig. S14 Evolution of adsorbed n-heptane volume (red) and film thickness (black) from a ZIF-8 thin film made by one deposition (adsorption, filled circles and desorption, open circles).

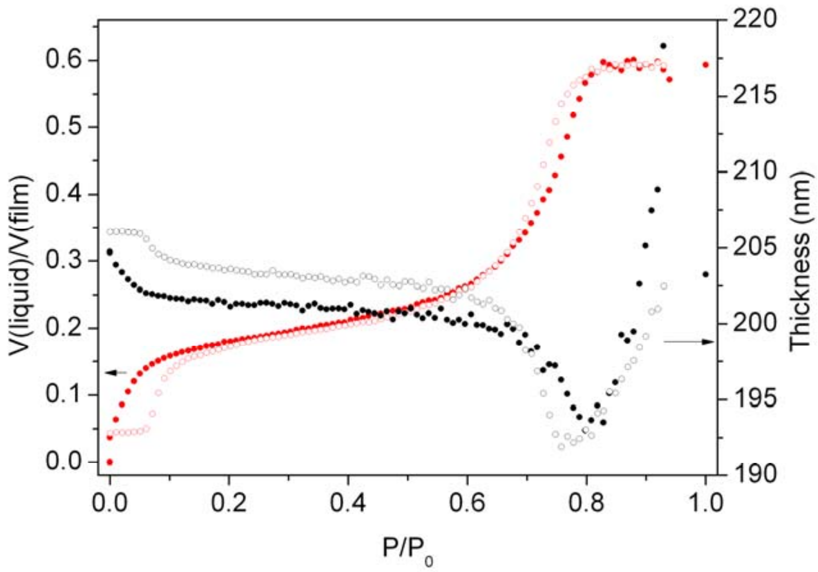

Fig. S15 Evolution of adsorbed iso-octane volume (red) and film thickness (black) from a ZIF-8 thin film made by one deposition (adsorption, filled circles and desorption, open circles).

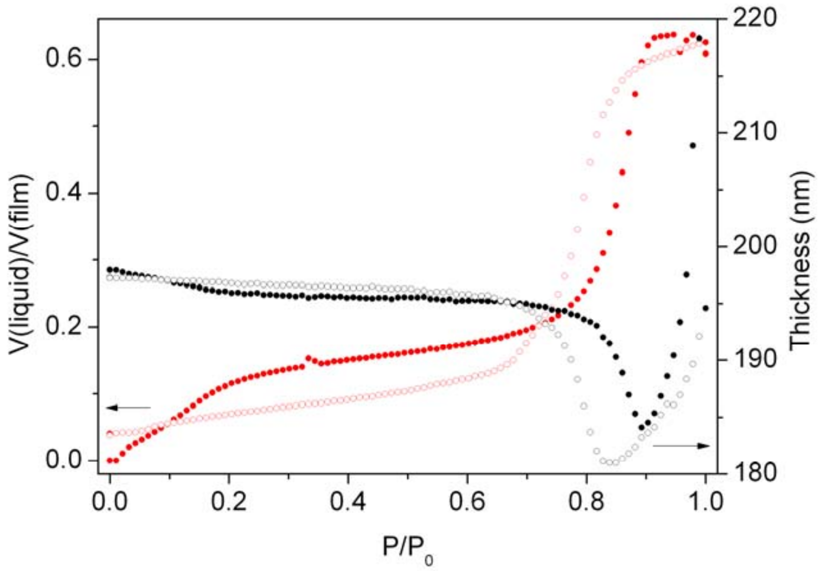

Fig. S16 Evolution of adsorbed cyclohexane volume (red) and film thickness (black) from a ZIF-8 thin film made by one deposition (adsorption, filled circles and desorption, open circles).

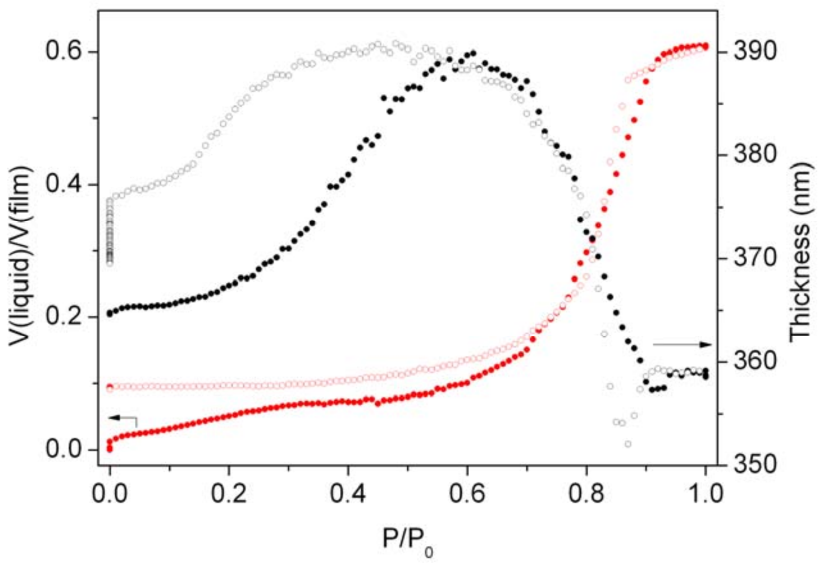

Fig. S17 Evolution of adsorbed toluene volume (red) and film thickness (black) from a ZIF-8 thin film made by one deposition (adsorption, filled circles and desorption, open circles).