## Supporting Information for

## Facile and Fast Transformation of Non-Luminescent to Highly Luminescent MOFs: Acetone Sensing for Diabetes Diagnosis and Lead Capture from Polluted Water

Mario Gutiérrez,<sup>1</sup> Annika F. Möslein,<sup>1</sup> and Jin-Chong Tan<sup>1\*</sup>

<sup>1</sup>Multifunctional Materials & Composites (MMC) Laboratory, Department of Engineering Science, University of Oxford, Parks Road, Oxford OX1 3PJ, United Kingdom.

\*Corresponding author: jin-chong.tan@eng.ox.ac.uk

**Figure S1.** FESEM images of different regions found in OX-1. **A)** Shows microsized OX-1 crystals while B) illustrates the small nanoplates.



**Figure S2.** FESEM-EDX images of Ag/OX-1 5min showing the concurrent presence of OX-1 big crystals and small transformed OX-2 ones.



**Figure S3.** FESEM-EDX images of Ag/OX-1 1h showing the coexistence of big crystals of OX-1 and nanocrystals of transformed OX-2.



**Figure S4.** FESEM-EDX images of a large area found in Ag/OX-1 24h, where microsized OX-1 crystals as well as converted OX-2 nanocrystals are observed.





**Figure S5.** Excitation-emission maps of **A**) Ag/OX-1 5min and **B**) Ag/OX-1 24h. The inset shows the emission quantum yield of each sample upon excitation at 330 nm.

**Figure S6. A-E)** FESEM-EDX images of different regions found in OX-1/OX-2 mixture obtained through the one-pot synthesis method. **F)** PXRD patterns of pristine OX-1 and OX-2 MOF and the related OX-1/OX-2 mixture. **G)** Excitation-emission map of the OX-1/OX-2 mixture. The inset illustrates the emission quantum yield upon excitation at 330 nm. **H)** Emission spectra of the OX-1/OX-2 mixture in different solvents, and **I)** is a graphical representation of its emission intensity maximum in each solvent. The samples were excited at 330 nm.



Figure S7. A) PXRD patterns and B) FTIR spectra of pristine OX-1, OX-1 treated with water and the converted Ag/OX-1 materials using different amounts of deionized water.





**Figure S8. A)** PXRD patterns and **B)** FTIR spectra of pristine OX-1, OX-1 treated with 1 drop of water and the mechanochemically converted Ag/OX-1. **C)** Photo of the OX-1 material before and after its conversion to OX-2 (grinding process) under UV irradiation. **D)** Photo of a mixture of AgNO<sub>3</sub> and OX-1 powders under UV irradiation and upon the addition of 1 drop of water and their subsequent grinding for 2 minutes.







**Figure S9.** Excitation-emission map of **A**) Ag/OX-1 50 $\mu$ L H<sub>2</sub>O, **B**) Ag/OX-1 100 $\mu$ L H<sub>2</sub>O and **C**) Ag/OX-1 250 $\mu$ L H<sub>2</sub>O materials. The inset shows a photo of the powders under UV irradiation and the emission quantum yield value of each sample upon excitation at 330 nm. **D**) Emission spectra of Ag/OX-1 250 $\mu$ L H<sub>2</sub>O in different solvents. The samples were excited at 330 nm.



Figure S10. Excitation-emission map of A) Ag/OX-1 ground at ambient conditions and B) Ag/OX-1 ground after the addition of 1 drop of water. The inset displays the emission quantum yield of each sample upon excitation at 330 nm. C) Emission spectra of Ag/OX-1 ground with 1 drop of water in different solvents and D) is a graphical representation of its intensity maximum in each solvent. The samples were excited at 330 nm.



**Figure S11.** PXRD patterns of the OX-1/PU membrane before and after being immersed in water for 20 minutes.

