

## Supplementary information

# UiO-66 3D Photonic Crystals Optical Sensor for Highly Efficient Chlorobenzene Vapor Detection

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## 1. General information

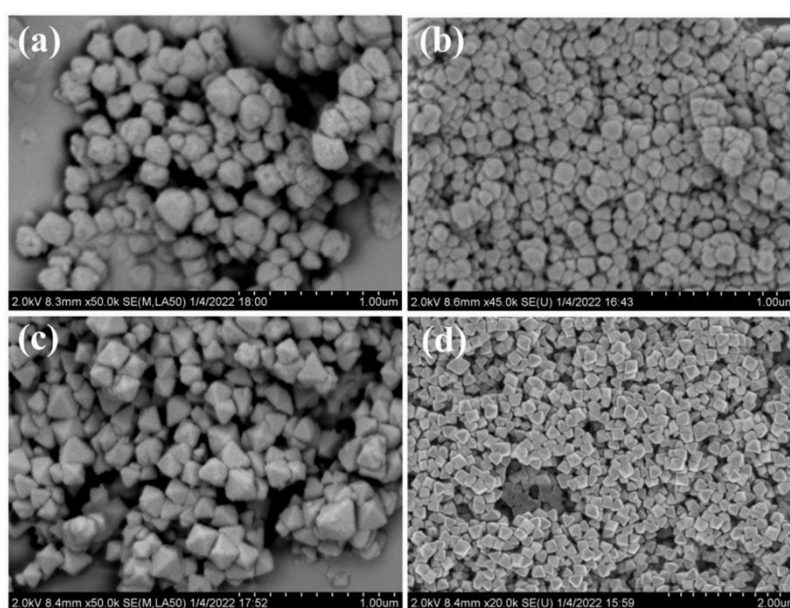
**Materials.** Zirconium tetrachloride ( $\text{ZrCl}_4$ ) was purchased from Shanghai Macklin Biochemical Co., Ltd. Terephthalic acid (BDC,  $\text{C}_8\text{H}_6\text{O}_4$ , AR,  $\geq 99.5\%$ ), 1,1,2-trichloroethane ( $\text{C}_2\text{H}_3\text{Cl}_3$ ), chlorobenzene ( $\text{C}_6\text{H}_5\text{Cl}$ ) and benzene ( $\text{C}_6\text{H}_6$ ) were obtained from Sinopharm Chemical Reagent Co., Ltd. N, N-dimethylformamide (DMF, AR,  $\geq 99.5\%$ ), acetic acid ( $\text{CH}_3\text{COOH}$ , AR,  $\geq 99.5\%$ ) and carbon tetrachloride ( $\text{CCl}_4$ , AR,  $\geq 99.5\%$ ) were acquired from Tian jin Fuyu Fine Chemical Co., Ltd. Polyvinylpyrrolidone (PVP,  $M_r=10,000$ ) was purchased from Sinopharm Chemical Reagent Co., Ltd (Shanghai, China). Methyl alcohol ( $\text{CH}_3\text{OH}$ , AR,  $\geq 99.5\%$ ), ethanol ( $\text{CH}_3\text{CH}_2\text{OH}$ , AR,  $\geq 99.5\%$ ) and dichloromethane ( $\text{CH}_2\text{Cl}_2$ , AR,  $\geq 99.5\%$ ) were got from Beijing Chemical Works.

**Characterization.** The surface and cross-section morphologies analysis of 3D PCs were investigated by Scanning Electron Microscope and Energy dispersive X-ray spectroscopy (SEM, EDS, JEM-6700 F). Powder X-ray diffraction (PXRD, Rigaku D/max,  $\lambda=1.5418 \text{ \AA}$ ) and Fourier transform infrared spectroscopy (FTIR, SPECTRUM 400) were used to research the performances of UiO-66 powders. The specific surface area was obtained from the  $\text{N}_2$  adsorption-desorption isotherms of the sample measured at 77 K using a JW-BK122W system.

## 2. Supplementary data

**Table S1.** Experimental parameters.

Sample	ZrCl <sub>4</sub> (mg)	BDC (mg)	DMF (ml)	CH <sub>3</sub> COOH(M)	Reaction conditions
1	34.9	24.9	10	0.5	120°C 24h
2	34.9	24.9	10	1.0	120°C 24h
3	34.9	24.9	10	1.5	120°C 24h
4	34.9	24.9	10	2.0	120°C 24h



**Figure S1.** SEM images of UiO-66 nanoparticles synthesized in the presence of (a) 0.5 M acetic acid (sample 1), (b) 1.0 M acetic acid (sample 2), (c) 1.5 M acetic acid (sample 3), (d) 2.0 M acetic acid (sample 4).