Electronic Supplementary Material

Synthesis of porous flower-like $SnO_2/CdSnO_3$ microstructures with excellent sensing performances for VOCs

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Characterizations

The products were characterized by X-ray diffraction (XRD; Shimadzu XRD-6000) using high-intensity Cu Kα radiation with a wavelength of 1.54178 Å, as well as field-emission scanning electron microscopy (FESEM; Hitachi S-4800) operated at 5 kV, high-resolution transmission electron microscopy (HRTEM; JEOL-2010 TEM) with an acceleration voltage of 200 kV, and N_2 adsorption–desorption isotherm measurements (Nova 2000E). The pore-size distribution was determined from the desorption branch of the isotherm using the Barrett–Joyner–Halenda (BJH) method. X-ray photoelectron spectroscopy (XPS; Thermo Fisher Scientific Nexsaa) was also performed. The element distribution of products was determined by energy dispersive spectroscopy (EDS; Oxford H-7593, operated at 15 kV).

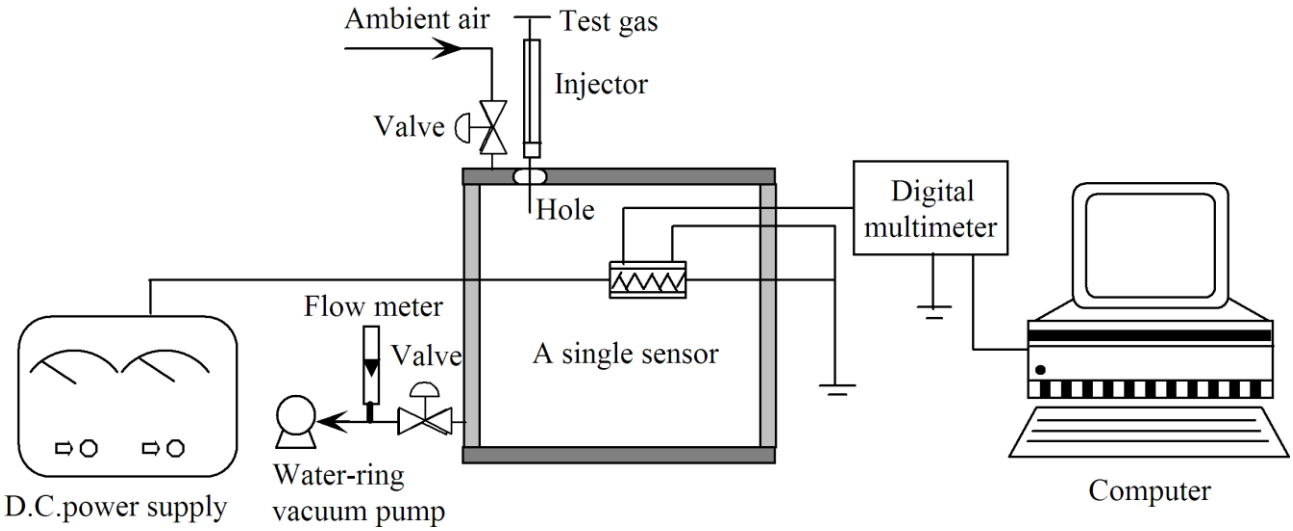

Fig. S1 The experimental set-up.

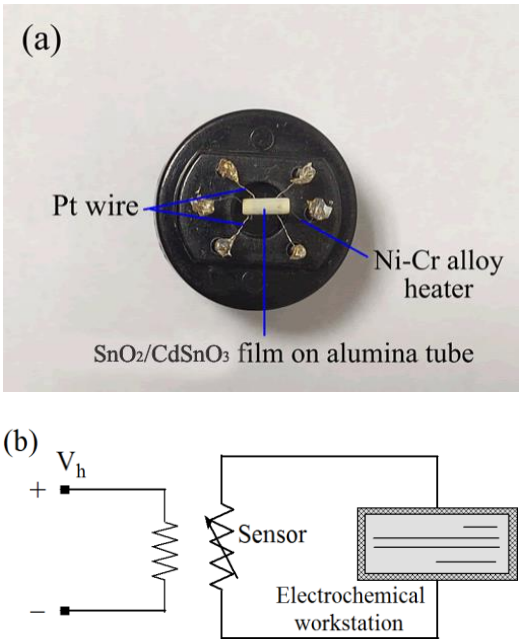

Fig. S2 (a) Photograph of the sensor and **(b)** diagram of the test principle of the gas sensing measurement system (V_h: heating voltage).

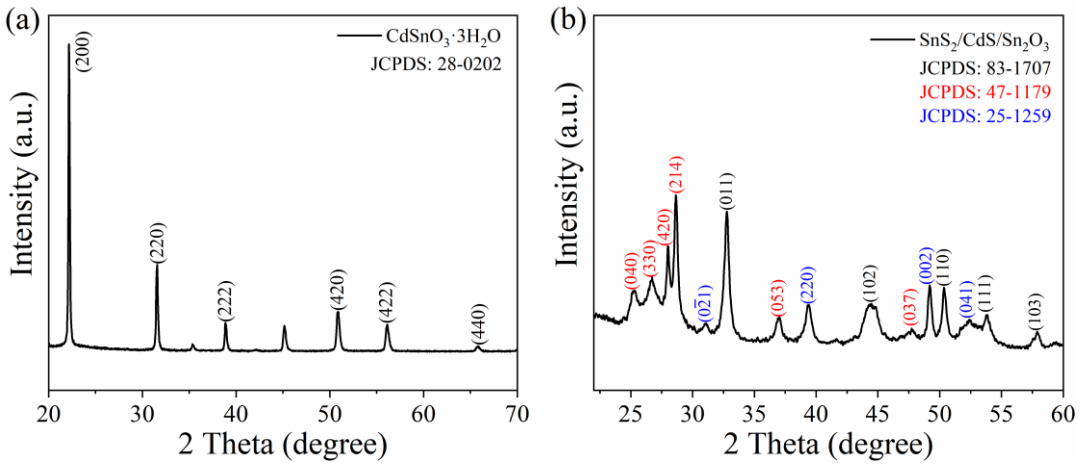

Fig. S3 XRD patterns of the sample **(a)** before and **(b)** after the vulcanization.

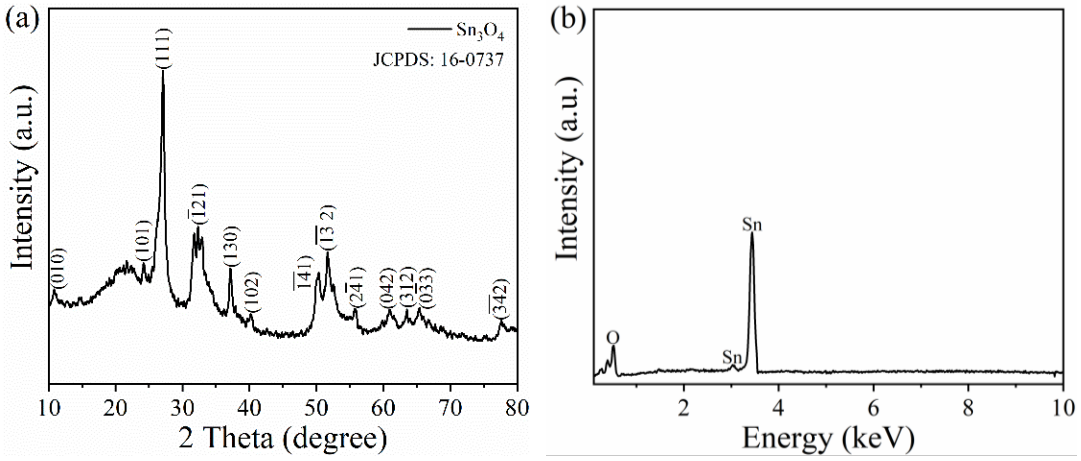

Fig. S4 (a) XRD pattern of the SnO_2 precursor and **(b)** EDS result of the pure flower-like SnO_2 sample.

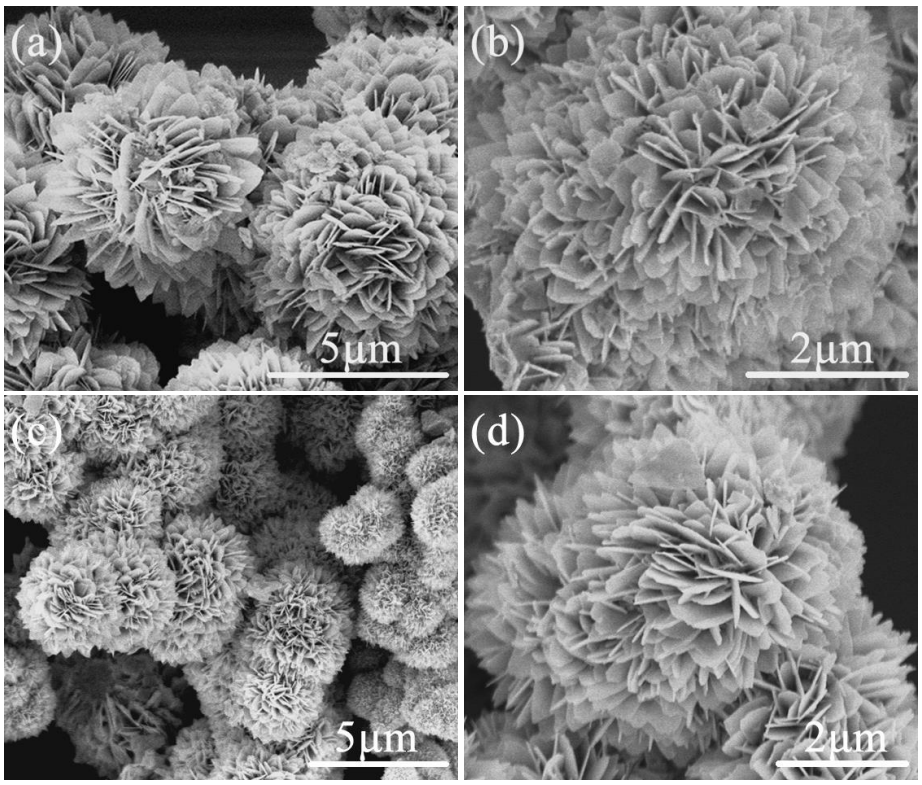

Fig. S5 SEM images of **(a)(b)** the precursor and **(c)(d)** the pure flower-like SnO_2 sample.

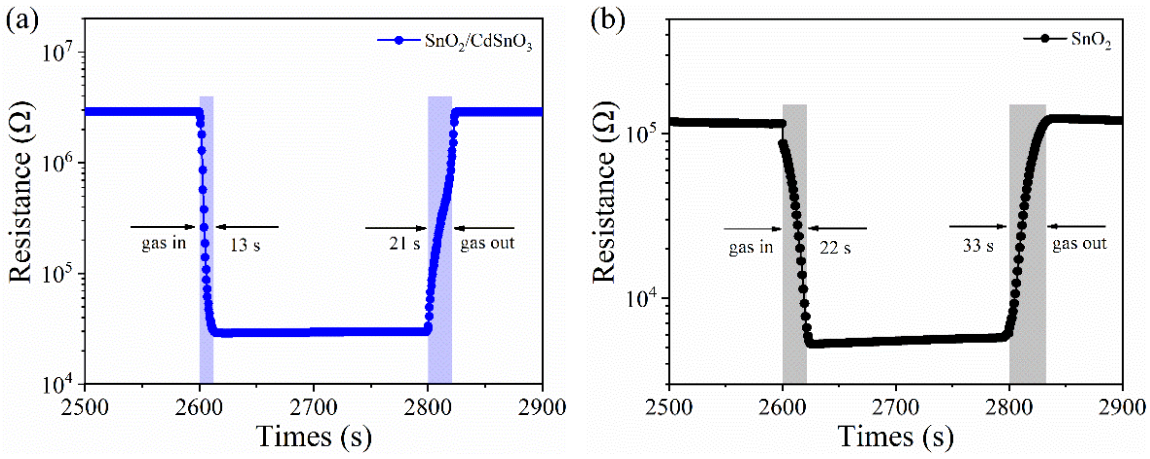

Fig. S6 Response and recovery characteristics of **(a)** porous flower-like $SnO_2/CdSnO_3$ and **(b)** porous flower-like SnO_2 sensors exposed to 100 ppm formaldehyde vapor.

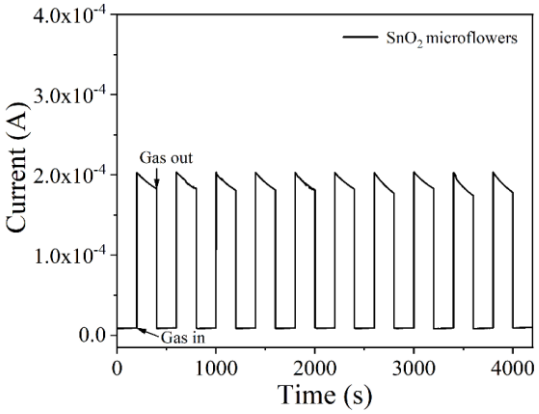

Fig. S7 Stability tests of the sensor based on pure porous flower-like SnO_2 for 10 cycles.

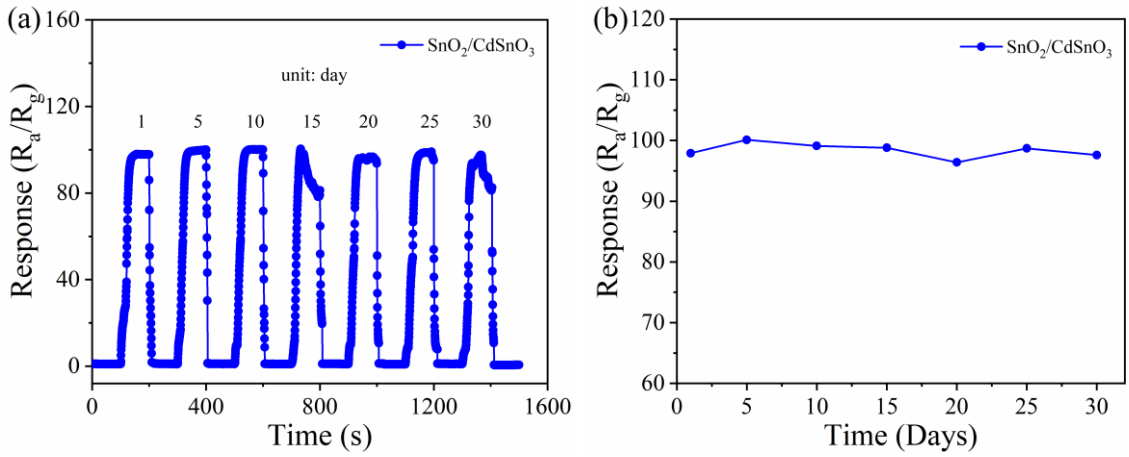

Fig. S8 Stability tests of the sensor based on $SnO_2/CdSnO_3$ for 30 d: **(a)** response curves; **(b)** response values.

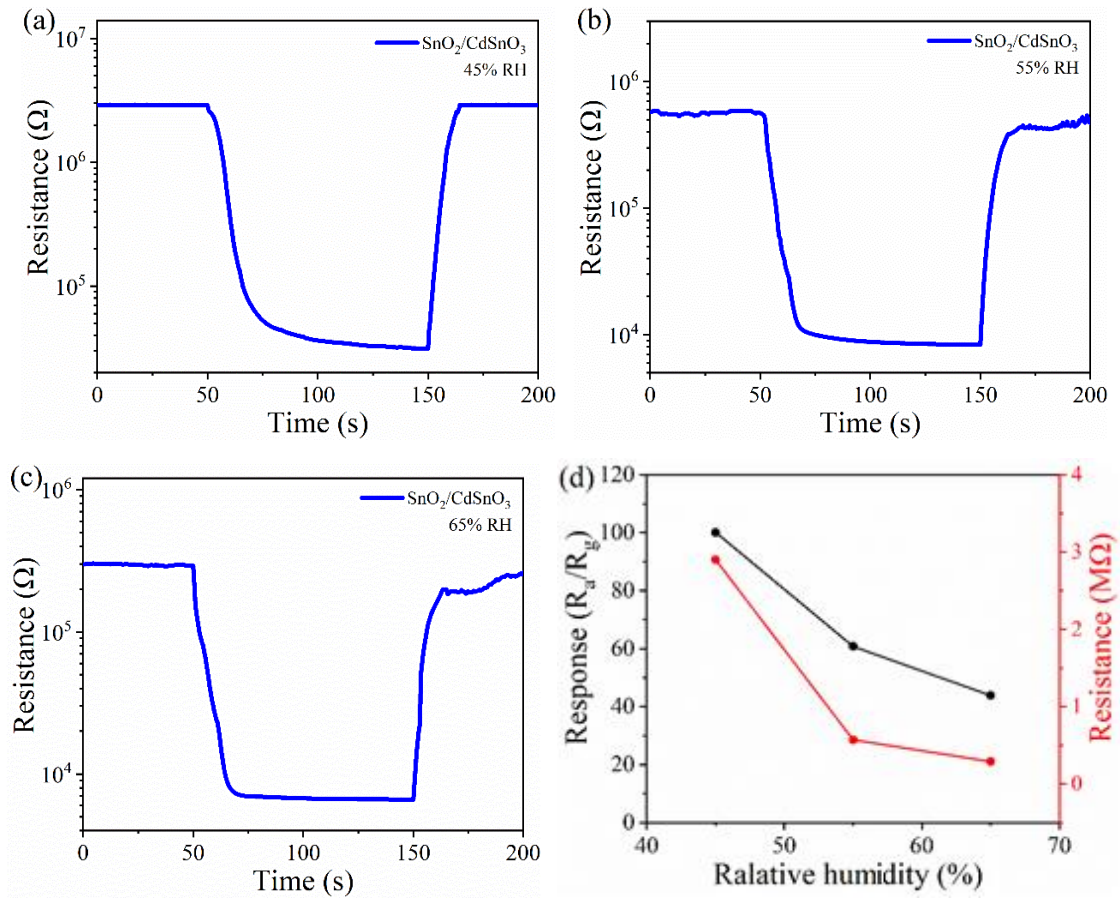

Fig. S9 (a)(b)(c) Dynamic response curves of the porous flowers-like $SnO_2/CdSnO_3$ sensor exposed to 100 ppm formaldehyde at 220 °C under different relative humidity (RH) values (45%, 55%, and 65% at 25 °C). **(d)** Responses and corresponding resistances under various RH values.