Supplementary Material

Dual regulation of hierarchical porosity and heterogeneous interfaces in Cu-BTC/Bi_2MoO_6 for thermally-driven and UV-light activated selective acetone sensing

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Figures

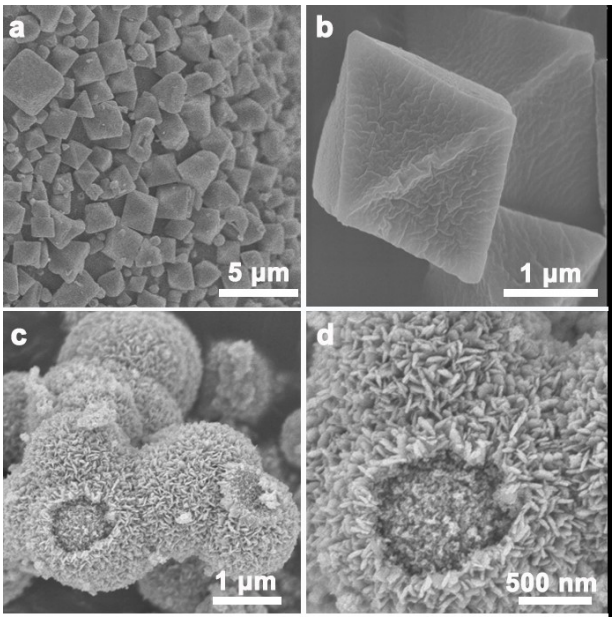

Fig. S1. SEM images of the pure CuM and BMO structures.

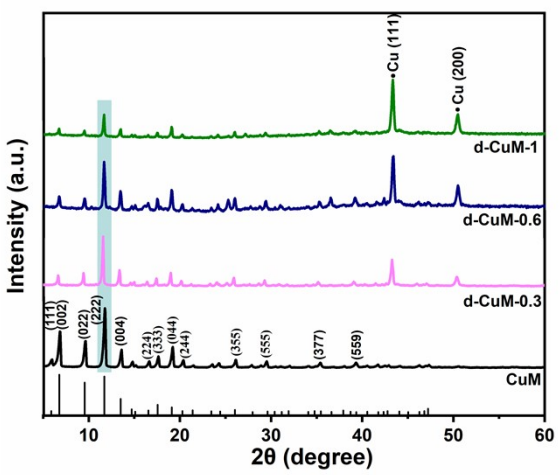

Fig. S2. XRD patterns of pure CuM and d-CuM-X precursors.

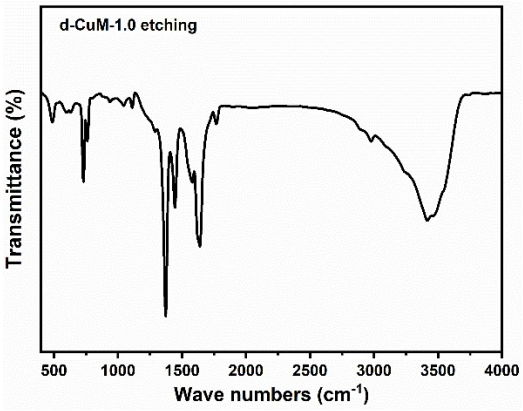

Fig. S3. FT-IR image of d-CuM-1.0 material.

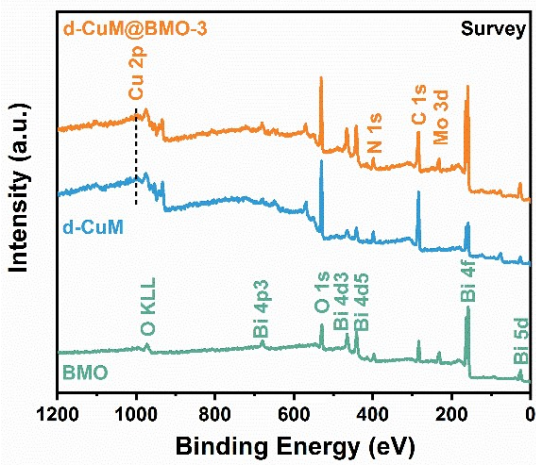

Fig. S4. XPS survey scan spectra of CuM, d-CuM and d-CuM@BMO-3.

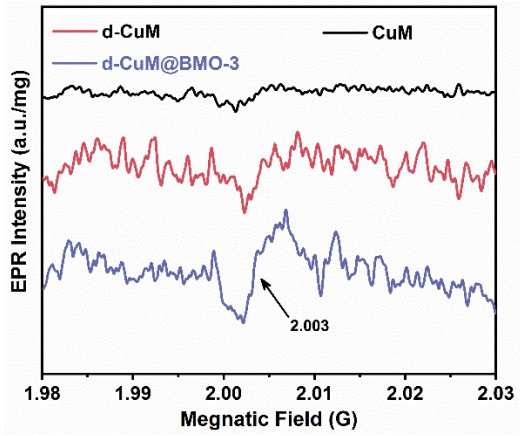

Fig. S5. EPR spectra of the CuM, d-CuM and d-CuM@BMO-3.

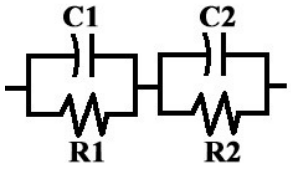

Fig. S6. The equivalent circuit model used to interpret the EIS data.

Table S1. The response data of BMO-based sensors toward acetone range from 30 ppm to 50 ppb at their optimal working temperature without visible-light.

Materials	Concentrations (ppm)						
	30	10	5	1	0.5	0.1	0.05
CuM	1.65	1.44	1.28	1.22	1.19	1.14	1.01
BMO	2.05	1.17	1.15	1.13	1.00	1.09	1.06
d-CuM@BMO-1	3.14	1.78	1.66	1.42	1.28	1.11	--
d-CuM@BMO-2	4.62	2.34	2.07	1.59	1.21	1.19	1.16
d-CuM@BMO-3	**7.38**	**4.21**	**2.57**	**1.82**	**1.45**	**1.28**	**1.13**

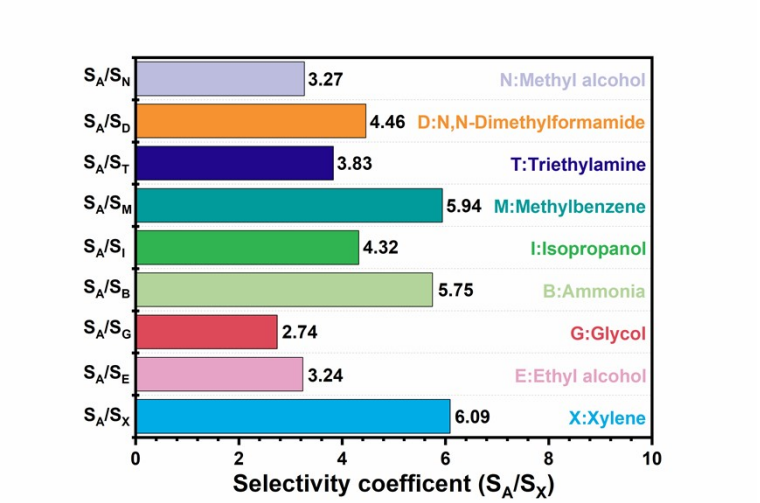

Fig. S7. Selectivity coefficient (S_A/S_X) histogram of d-CuM@BMO-3 at 270 °C.

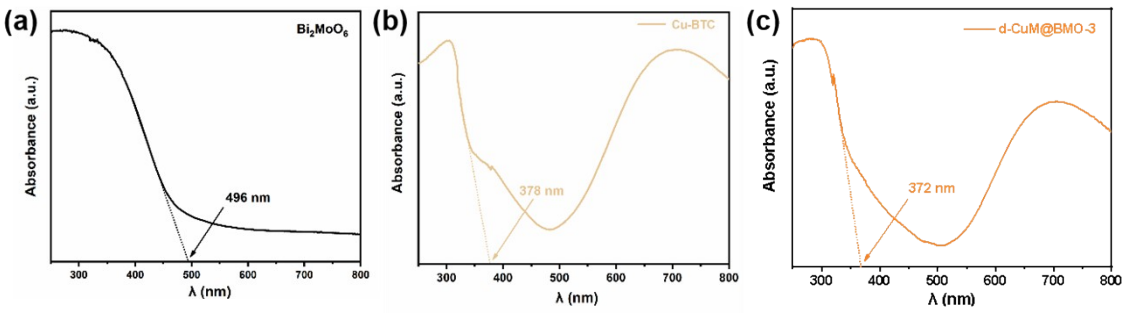

Fig. S8. (a, b and c) DRS spectra of pure BMO, CuM and d-CuM@BMO-3.

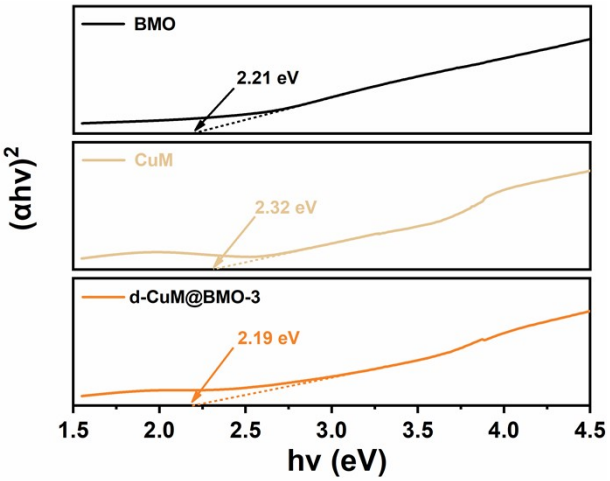

Fig. S9. (a, b and c) Toc plots of pure BMO, CuM and d-CuM@BMO-3.

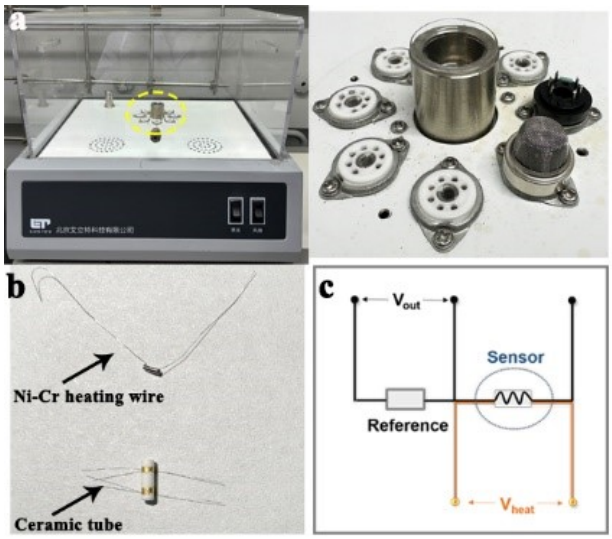

Fig. S10. (a) Digital photographs of gas-sensing measurement. (b) Digital photograph of the gas-sensing device. (c) The inner working circuit of the gas-sensing device.

Fig. S10(a) shows the CGS-8 gas sensing measurement system with a sealed chamber, in which a given amount of acetone was injected into the evaporator using a microsyringe under static condition through the injection hole. Prior to each injection of gas molecules with different concentrations, the chamber was closed and the fan was turned on to accelerate the gas diffusion. The gas concentration is calculated from the following equation:

$$C(ppm) = \frac{V(mL) \times \rho(g/mL) \times 22.4(L/mol)}{M(g/mol) \times 20(L)}$$

where V represents the volume of the injected liquid gas (mL), and ρ is the density; M is the molecular weight; 20 L is the total chamber volume.