

Supporting Information

Two-dimensional bimetallic phthalocyanine covalent organic framework-based chemiresistive gas sensor for ppb-level NO₂ detection

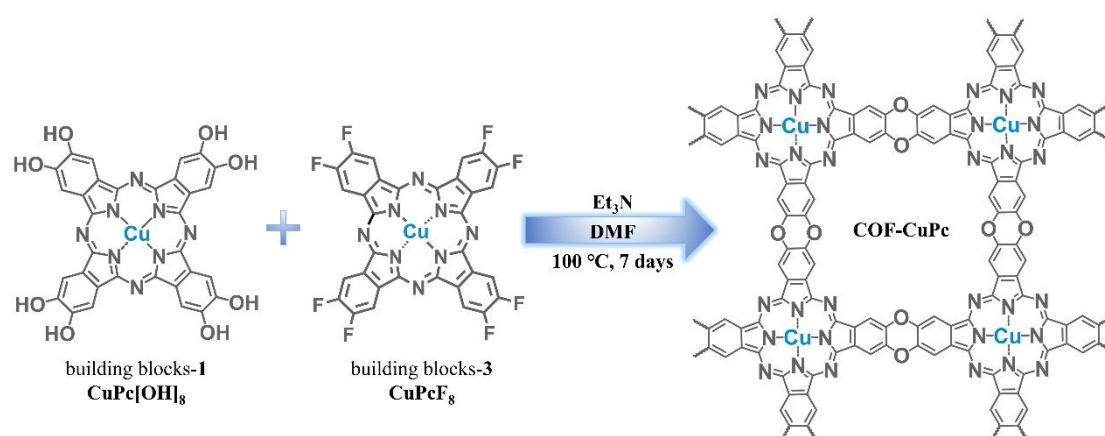


Figure S1. Synthetic route and representative structure of COF-CuPc.

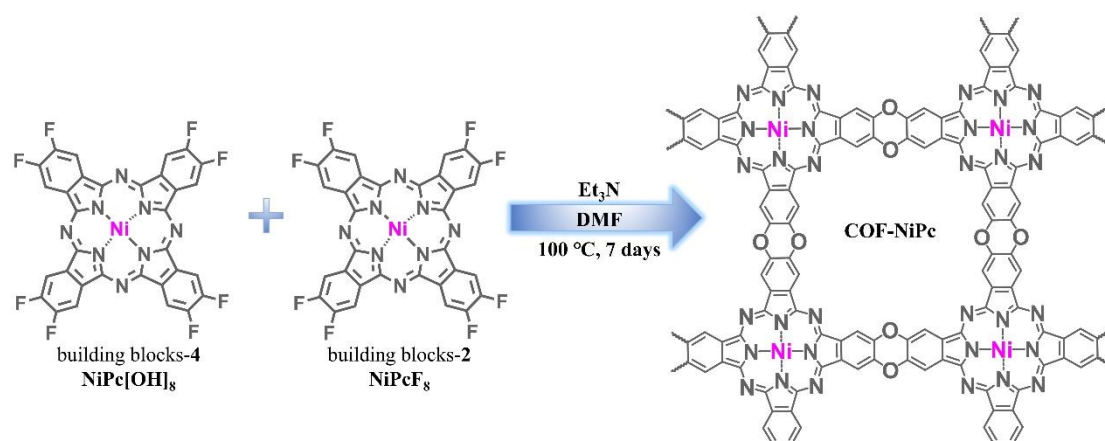


Figure S2. Synthetic route and representative structure of COF-NiPc.

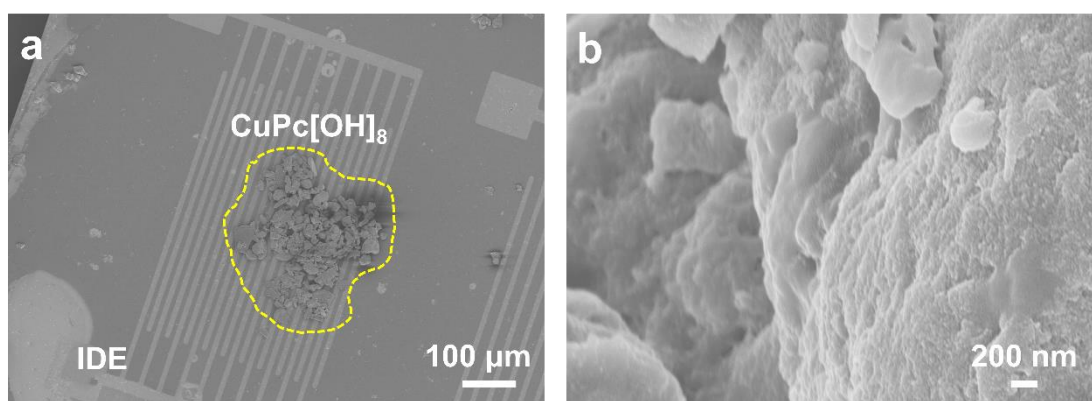


Figure S3. SEM images of CuPc[OH]₈ with a scale bar of (a) 100 μm and (b) 200 nm on IDEs substrate.

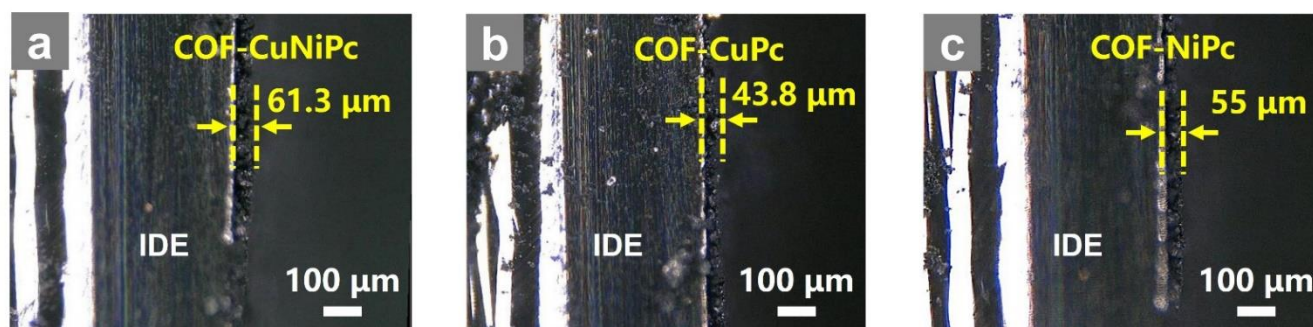


Figure S4. Optical images of the cross-sectional view of the IDE-sensors based on (a) COF-CuNiPc, (b) COF-CuPc, and (c) COF-NiPc.

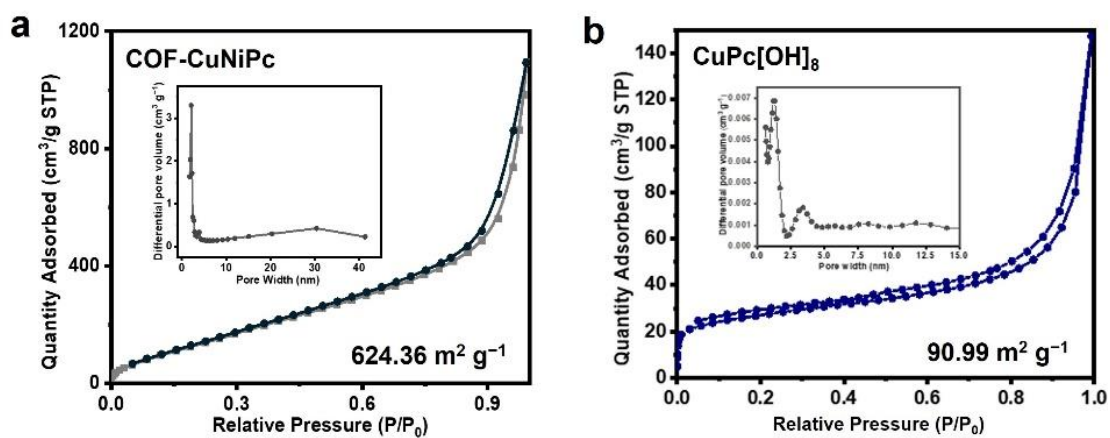


Figure S5. BET Nitrogen sorption isotherm curves and pore size distribution of (a) COF-CuNiPc and (b) CuPc[OH]₈.

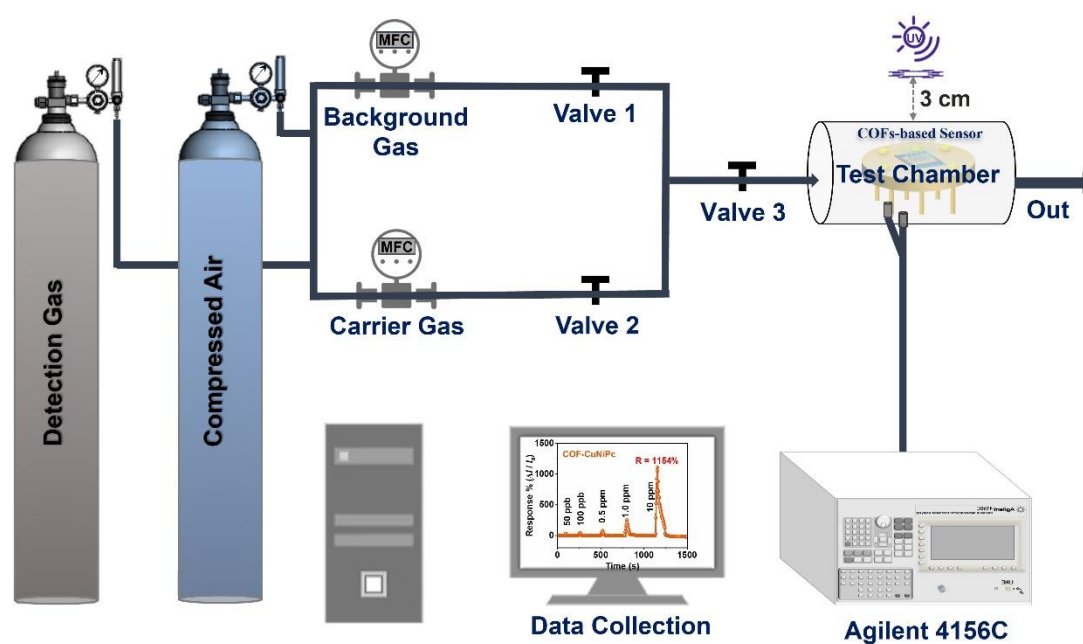


Figure S6. Schematic diagram of the NO₂ sensor test system.

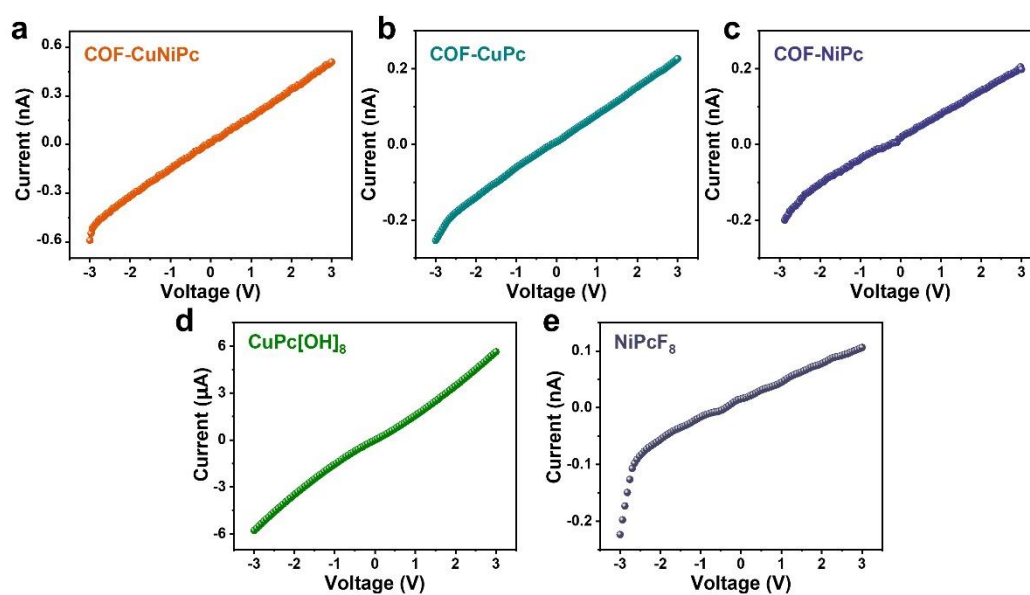


Figure S7. *I-V* curves of the (a) COF-CuNiPc, (b) COF-CuPc, (c) COF-NiPc, (d) CuPc[OH]₈, and (e) NiPcF₈-based chemiresistive device under ± 3 V bias in a dry compressed air atmosphere at RT.

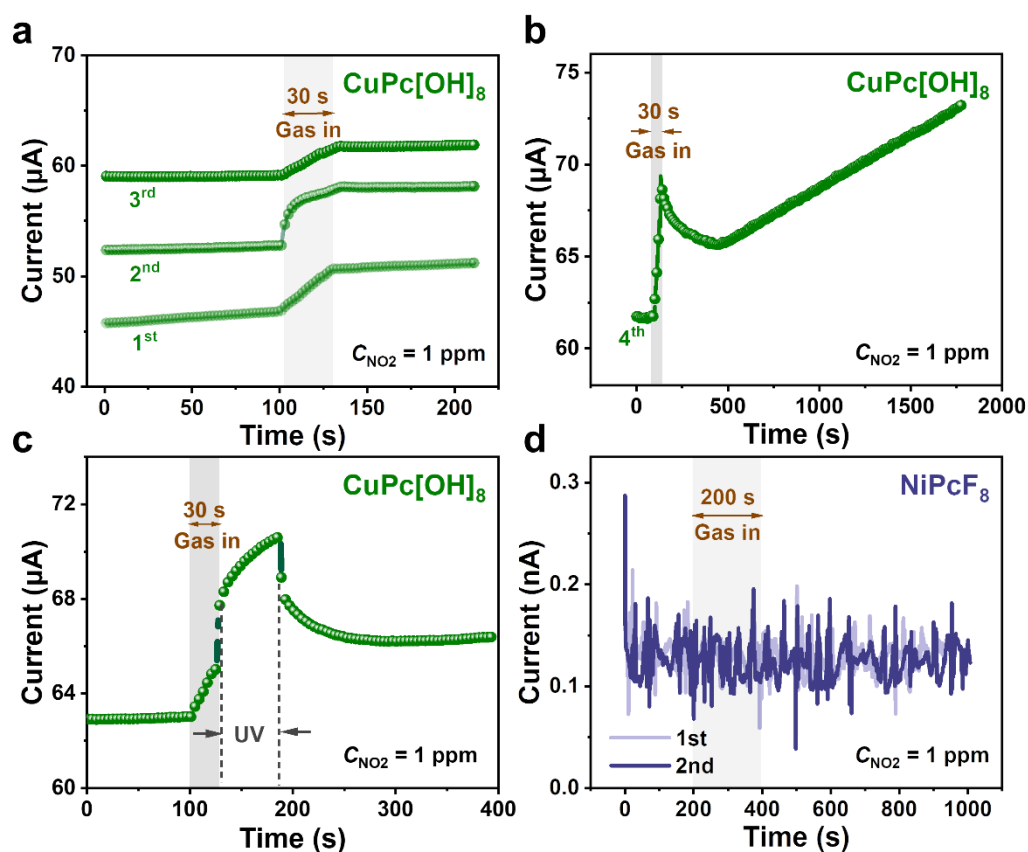


Figure S8. (a) The 1st, 2nd, and 3rd, (b) 4th, and (c) UV-light-assisted dynamic response characteristic curves of CuPc[OH]₈ (building block-1)-based chemiresistive device exposed to 1 ppm NO₂ for 30 s at RT. (d) Dynamic response characteristic curves of NiPcF₈ (building block-2)-based device.

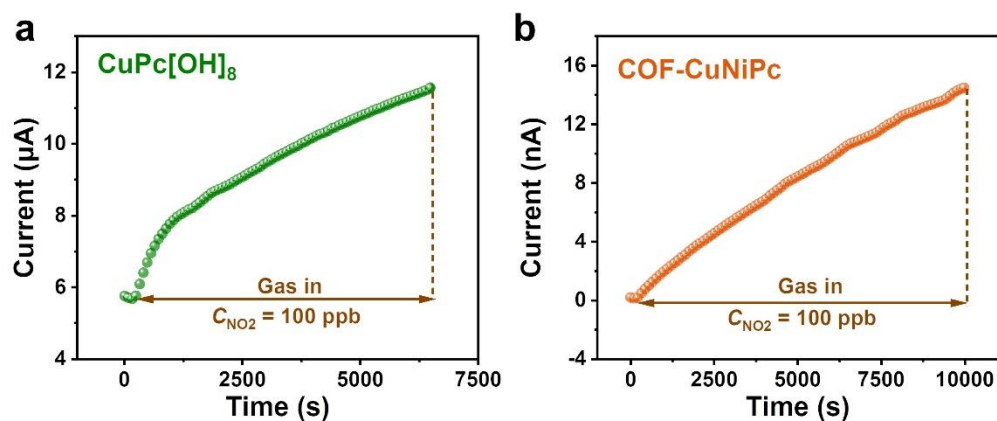


Figure S9. (a) Dynamic response characteristic curves of CuPc[OH]₈-based device, and (b) COF-CuNiPc-based chemiresistive device exposed to 100 ppb NO₂ for a long time (>6000 s) at RT.

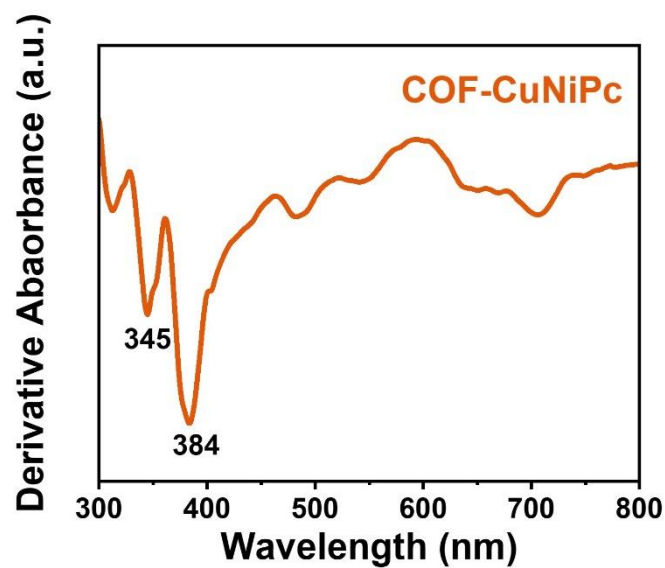


Figure S10. The absorption peak positions of COF-CuNiPc were differentiated once with the assistance of the absorption spectrum of UV-Vis DRS.

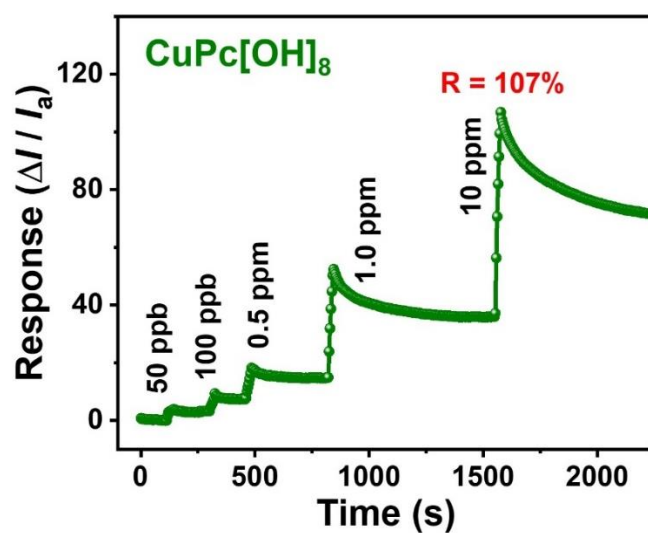


Figure S11. Dynamic current characteristic curve of CuPc[OH]₈-based sensor exposed to different concentrations of NO₂ (0.05, 0.1, 0.5, 1.0, and 10 ppm) with UV-assisted recovery.

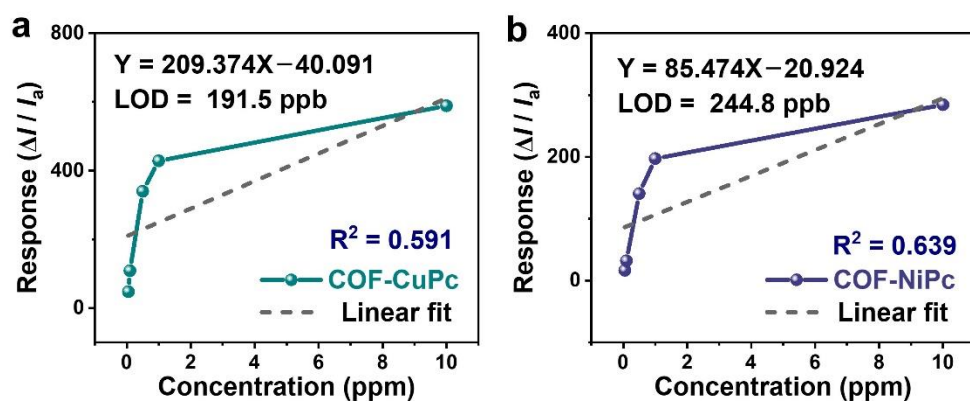


Figure S12. The linear fit curve of response versus the concentration absorption for the gas sensors based on (a) COF-CuPc and (b) COF-NiPc.

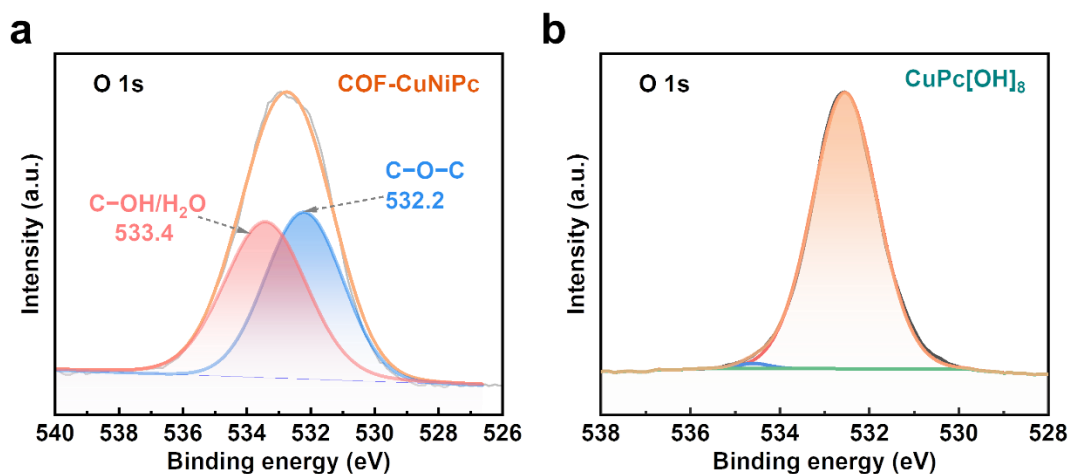


Figure S13. High-resolution O 1s core-level XPS spectra of (a) COF-CuNiPc and (b) CuPc[OH]₈.