

Electronic Supplementary Information for

Promoting the surface catalytic oxidation activity of MOF-derived Co₃O₄ rectangular rods via Cr-doping for ppb-level xylene detection

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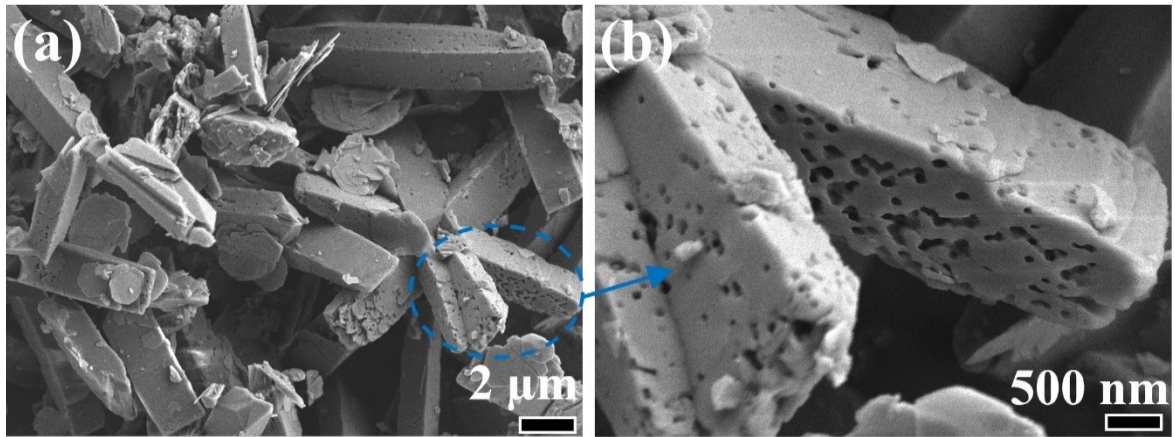


Fig. S1 FESEM images of (a, b) the pure Co-MOF precursor.

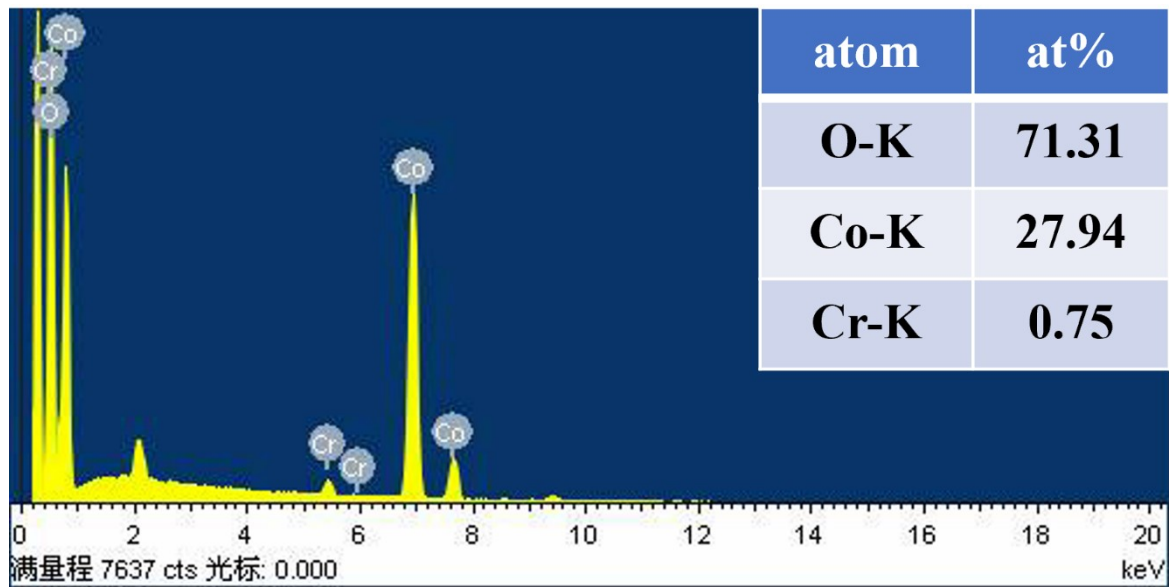


Fig. S2 EDS elemental analysis of the 3 at% Cr-Co₃O₄ sample.

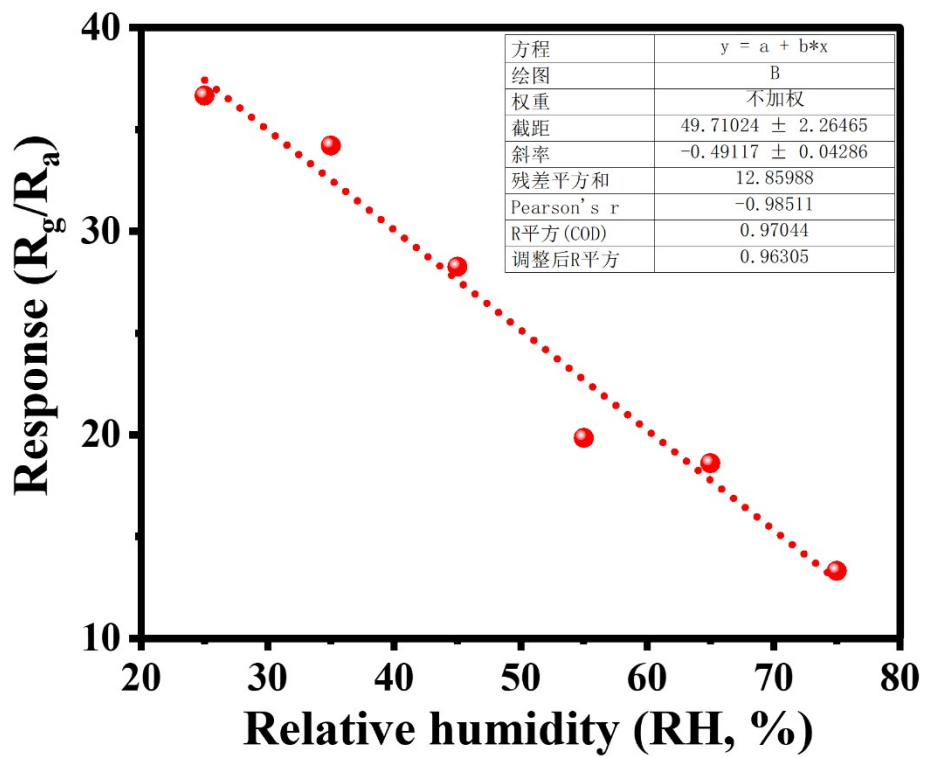


Fig. S3 Linear relationship of the R_g/R_a ratio vs RHs.

Calculation of the theoretical limit of detection (LOD)

The noise value for the sensor was calculated using the variation in the relative sensor response in the baseline level using the root-mean-square (RMS) deviation. 50 points obtained from Fig. 5a before exposed to xylene were averaged and a standard deviation (S^2) was gathered as 0.002704. The RMS noise can be calculated as following formula:

$$RMS_{noise} = \sqrt{S^2/N} \quad (N = 50)$$

The RMS noise was calculated to be 0.007354

According to the IUPAC definition, the signal (S) to noise (N) ratio (S/N) is 3, and the slope is 0.6968 from inset of Fig. 5c, therefore, the theoretic limit of detection (LOD) can be calculated as following:

$$LOD = 3 * (RMS_{noise} / Slope) = 3 * (0.007354 / 0.6968) = 0.03166 \text{ ppm} = 31.7 \text{ ppb}$$