

Electronic Supplementary Material (ESI) for
Excellent humidity sensor based on ultrathin HKUST-1
nanosheets

Qiaoe Wang ^a, Meiling Lian ^b Xiaowen Zhu ^b, Xu Chen ^{b*}

^a *Key Laboratory of Cosmetic, Beijing Technology and Business University, China*

National Light Industry, Beijing 100048

^b *State Key Laboratory of Chemical Resource Engineering, Beijing University of*

Chemical Technology, Beijing 100029, P.R. China

Corresponding author:

E-mail: chenxu@mail.buct.edu.cn.

Supplementary Figures

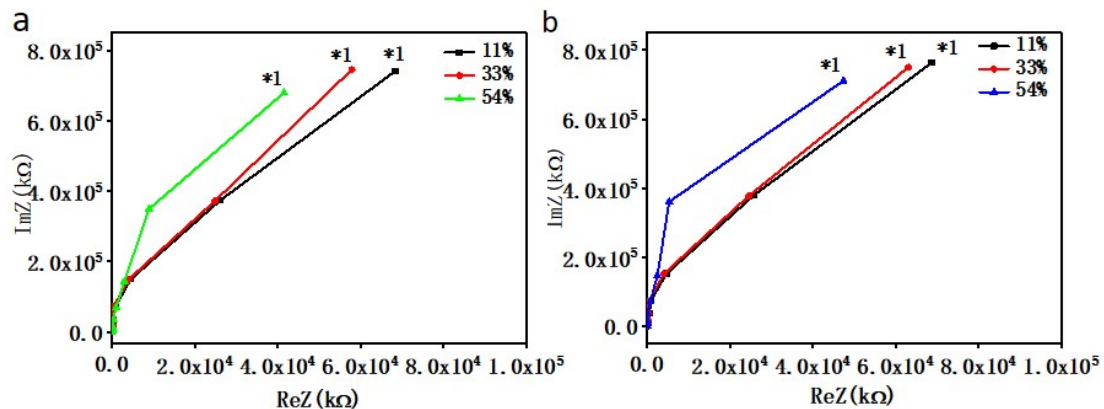


Fig. S1. The enlarged view for the impedance plots of HKUST-1 nanosheets (a) and HKUST-1 octahedron (b) for the 11, 33 and 54% RH in Figure 2.

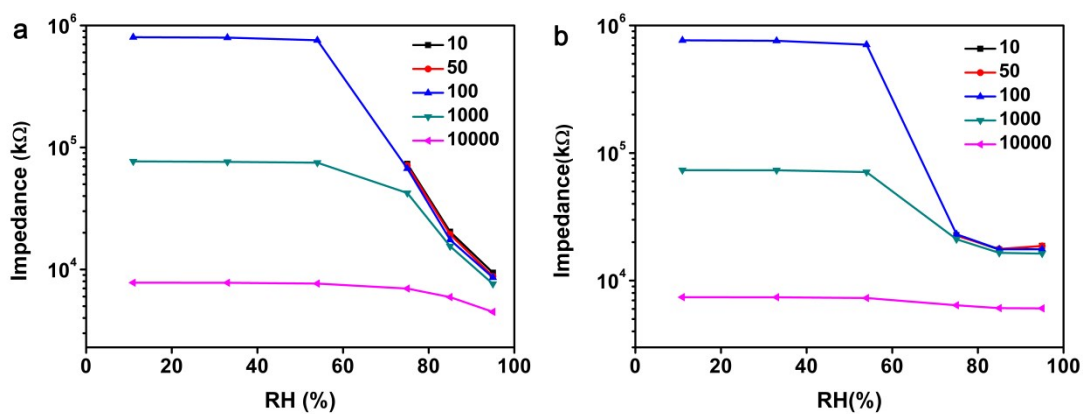


Fig. S2. The dependence of impedance on RH for the sensor based on (a) HKUST-1 ultrathin nanosheets (b) HKUST-1 octahedron, measured at various frequencies.

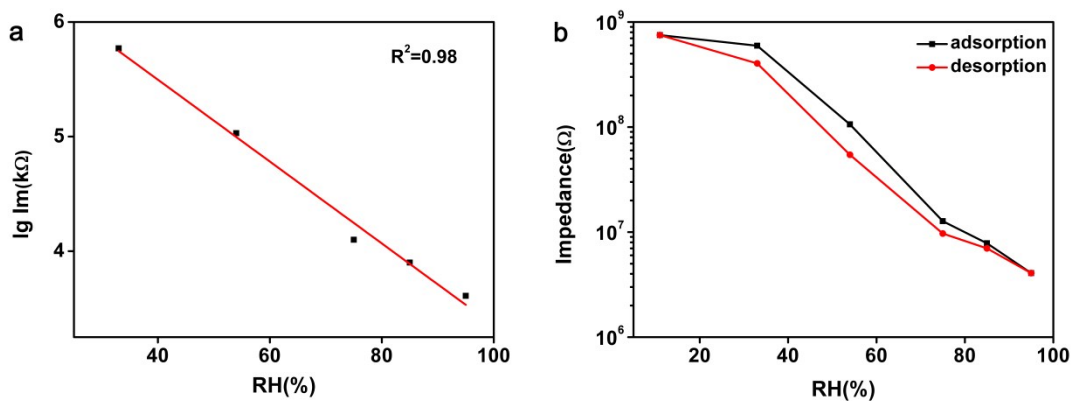


Fig. S3. (a) Linear impedance response to relative humidity of HKUST-1 nanosheets. (b) The impedance hysteresis characteristic of HKUST-1 nanosheets.

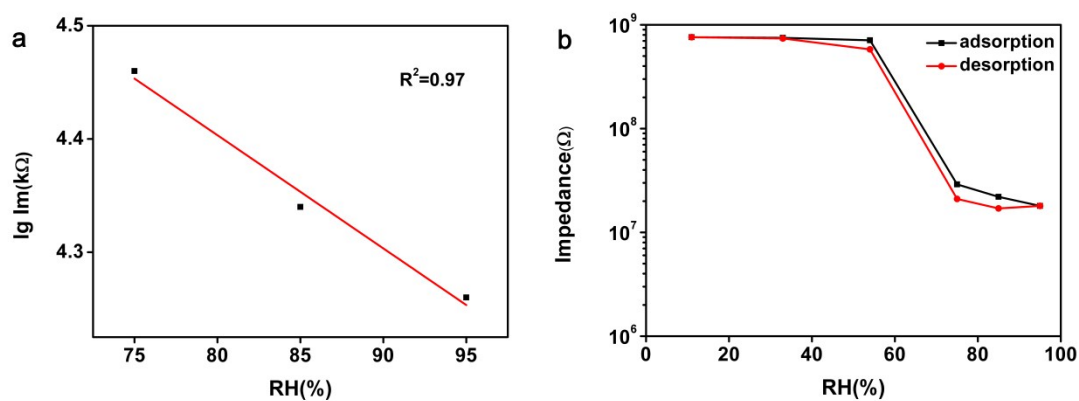


Fig. S4. (a) Linear impedance response to relative humidity of HKUST-1 octahedron. (b) The impedance hysteresis characteristic of HKUST-1 octahedron.

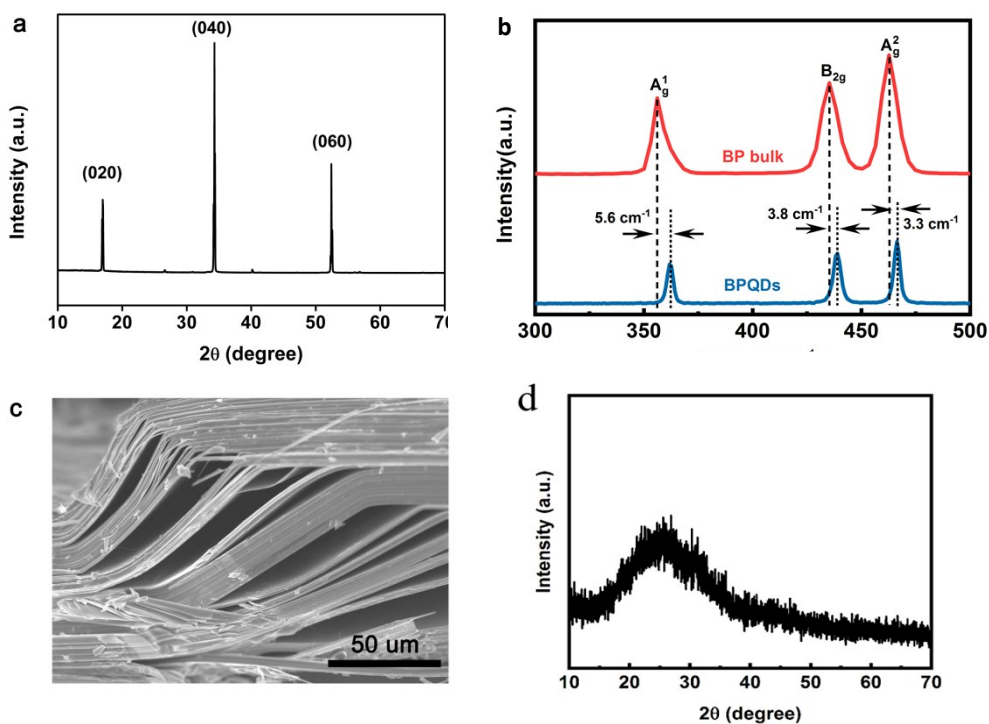


Fig. S5. (a) XRD pattern, (b) Raman spectrum (red line), (c) SEM image of BP bulk, and (b) Raman spectrum (blue line) and (d) XRD pattern of BPDQs.

Different from the XRD spectrum of the BP bulk (Figure S5a), no obvious diffraction peak is observed in XRD pattern of BPQD (Figure S5d), and only very weak broad peak at $20-40^\circ$ is maybe ascribed to ground glass substrate.

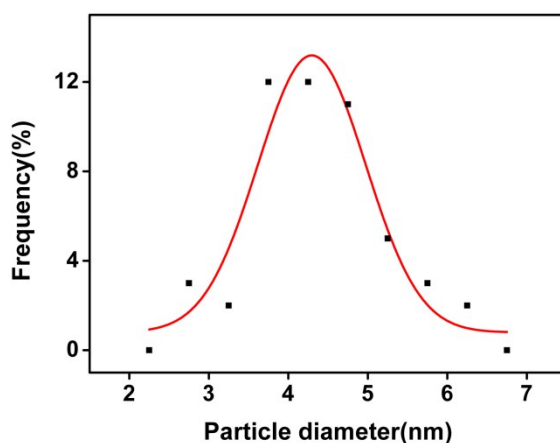


Fig. S6. Particle size distribution of BPQDs.

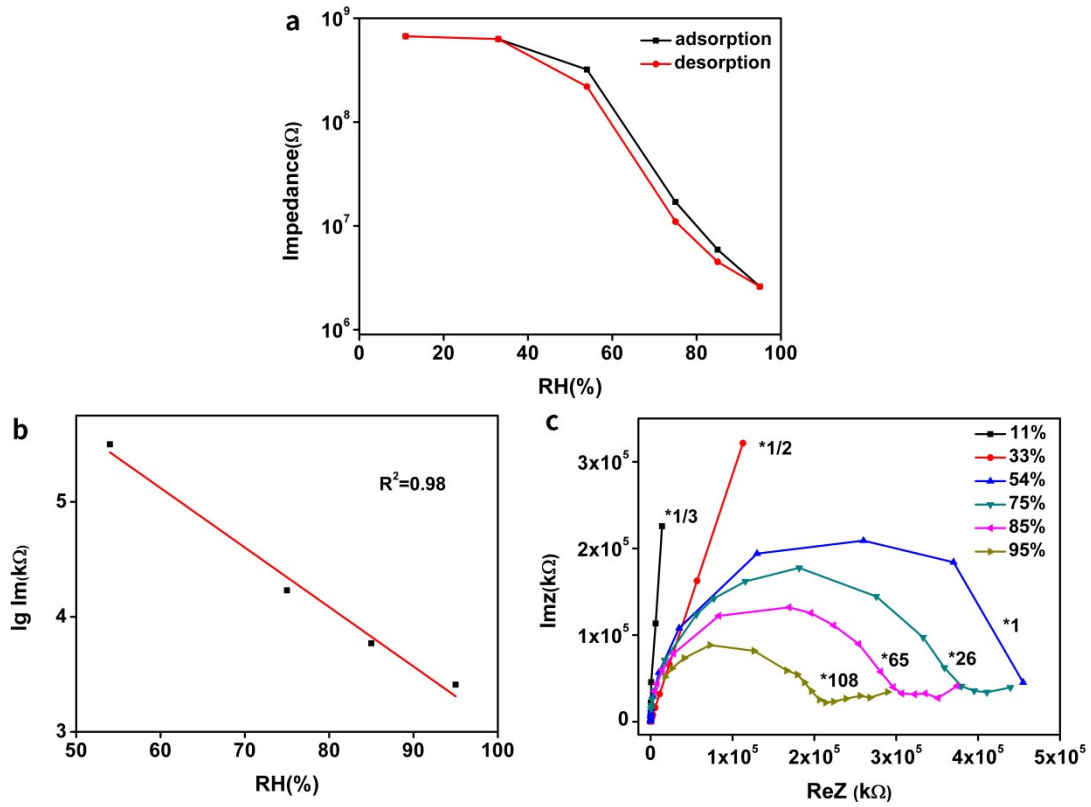


Fig. S7. (a) The response and recovery characteristics of BPQDs. (b) The impedance hysteresis characteristic of BPQDs. (c) Linear impedance response to relative humidity of BPQDs. (d) The impedance plot of BPQDs.

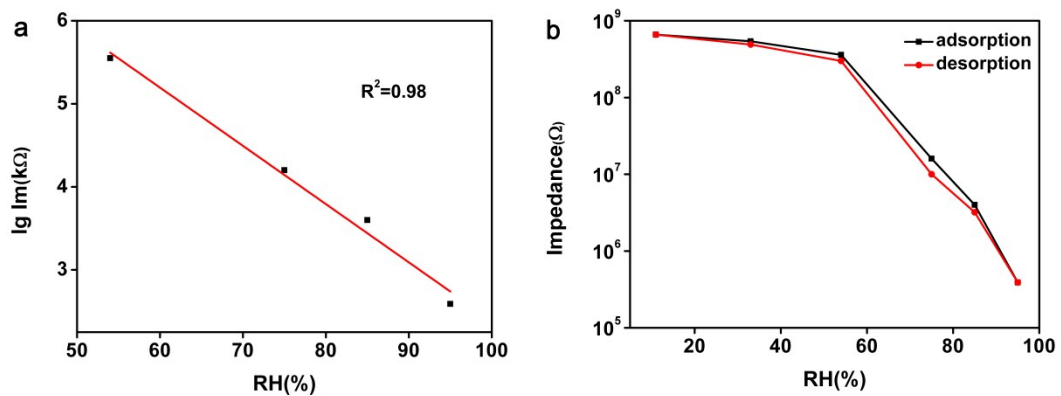


Fig. S8. (a) Linear impedance response to relative humidity of BPQDs / HKUST-1 nanosheets. (b) The impedance hysteresis characteristic of BPQDs / HKUST-1 nanosheets.

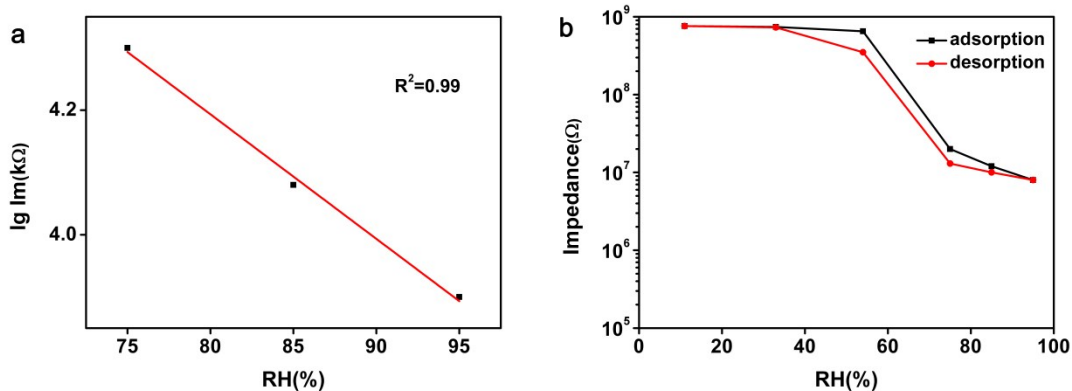


Fig. S9. (a) Linear impedance response to relative humidity of BPQDs / HKUST-1 octahedron. (b) The impedance hysteresis characteristic of BPQDs / HKUST-1 octahedron.

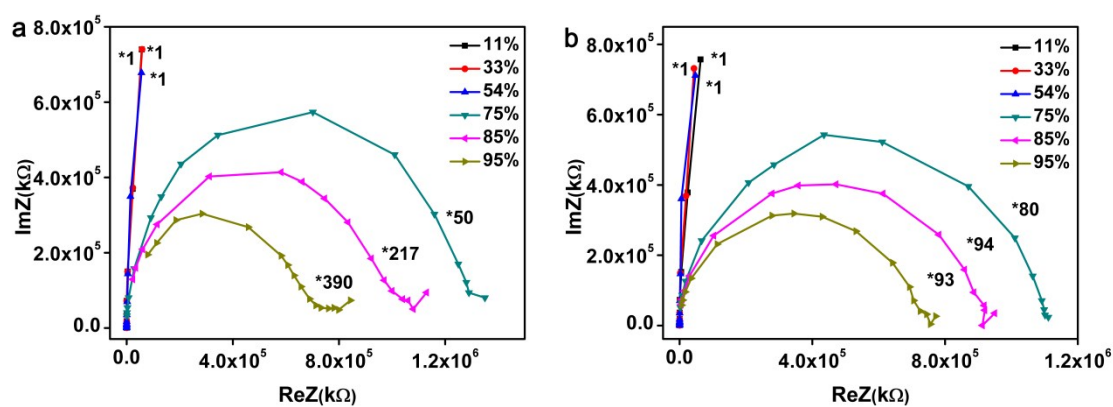


Fig. S10. The impedance plots of BPQDs/HKUST-1 nanosheets (a) and BPQDs/HKUST-1 octahedron (b).

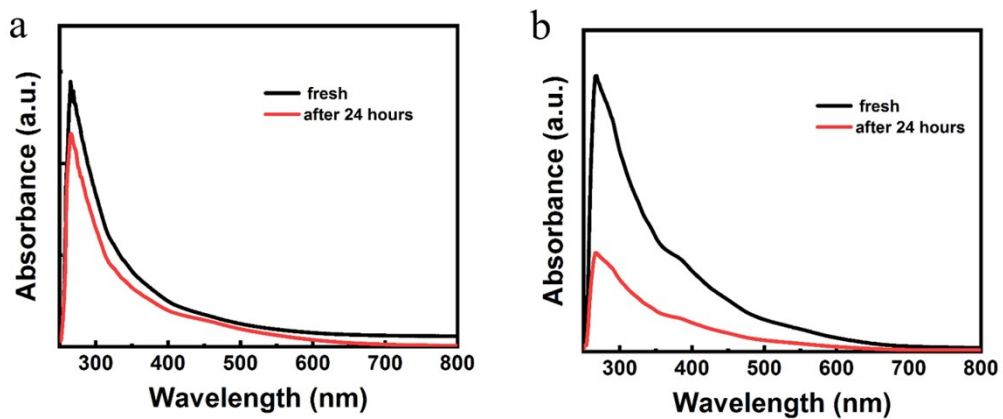


Fig. S11 (a) UV-vis absorption spectra of fresh BPQDs and exposure to the air after 24 h in NMP. (b) UV-vis absorption spectra of fresh BPQDs and exposure to the air after 24 h in ethanol.

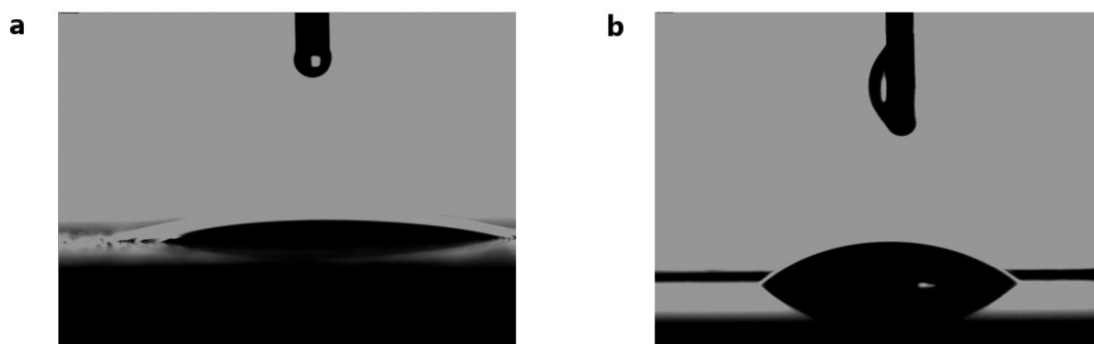


Fig. S12. (a) Contact angle of NMP drops on ultrathin HKUST-1 nanosheets. (b) Contact angle of NMP drops on a glass slide.

Table 1. The sensitivity of the humidity sensors based on various materials.

Materials	Sensitivity ($\text{K}\Omega\ \%RH^{-1}$)
HKUST-1 nanosheets	2.331
HKUST-1 octahedron	0.079
BPQDs/HKUST-1 nanosheets	18.387
BPQDs/HKUST-1 octahedron	0.126