Electronic Supplementary Material (ESI) for Nanoscale.

Facile Synthesis of Novel 3D Nanoflower-Like Cu_xO/Multilayer Graphene Composites for Room Temperature NO_x Gas Sensor Application

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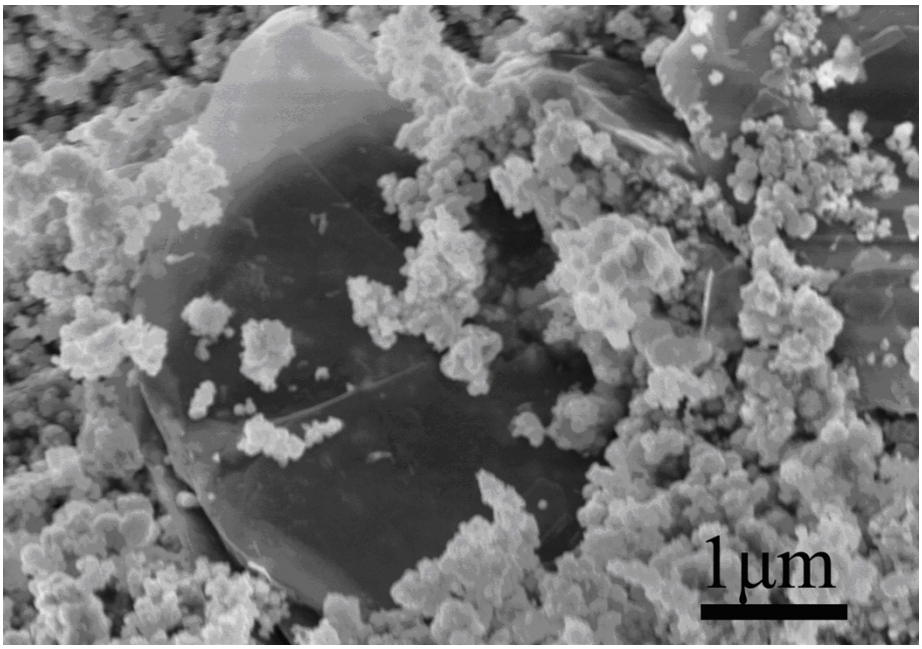

Fig. S1 SEM image of Cu_xO/multilayer graphene composite using EG as carbon resource

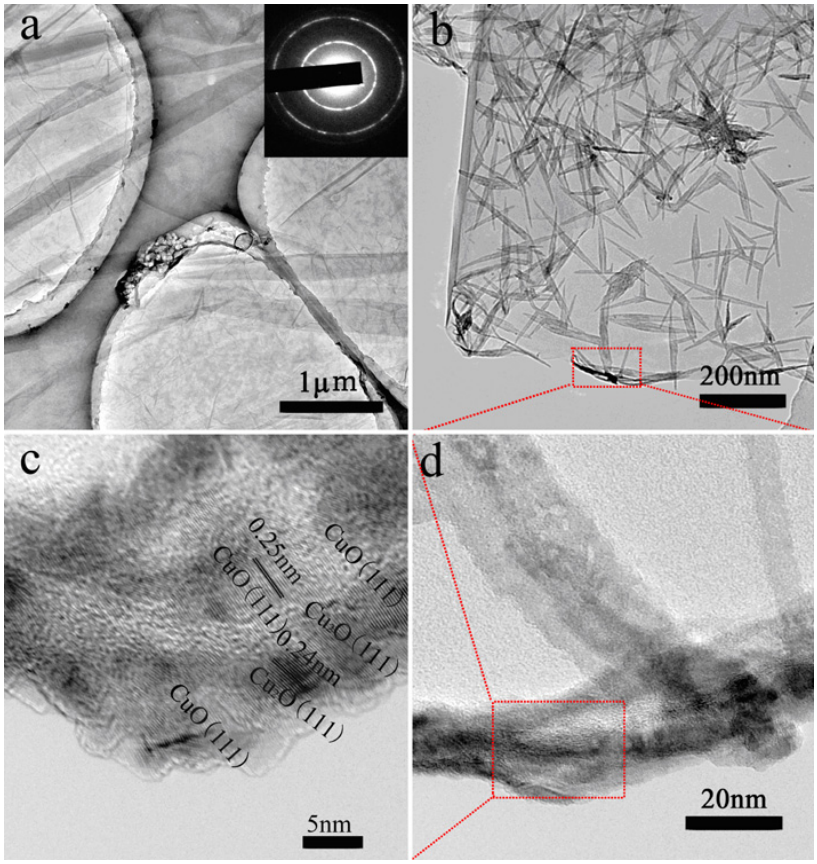

Fig. S2 (a) TEM image of GO, the inset shows the SAED pattern; (b) Representative TEM image of Cu_xO/RGO; (c) HRTEM image of part of Cu_xO/RGO; (d) TEM image of Cu_xO/RGO

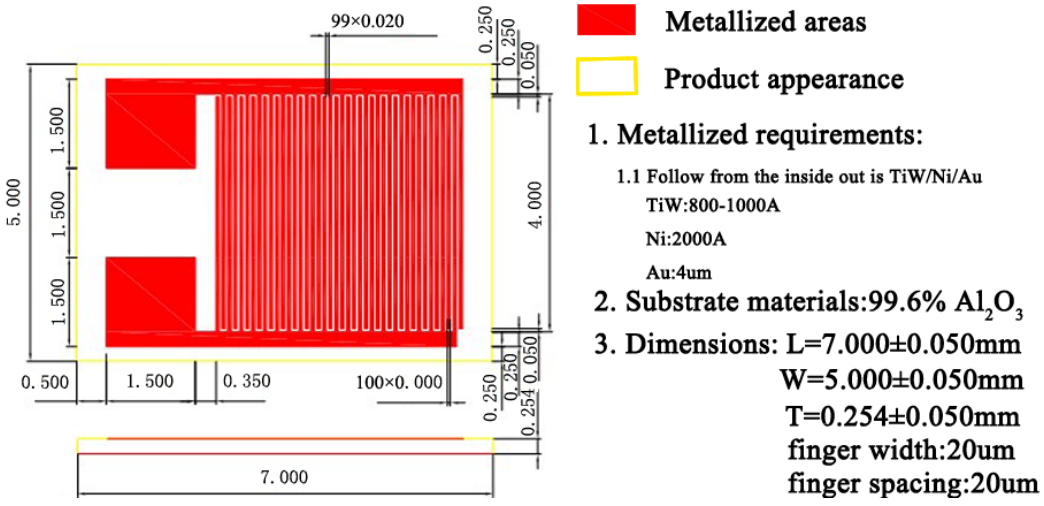

Fig. S3 The image of interdigitated gold electrode and its parameters.

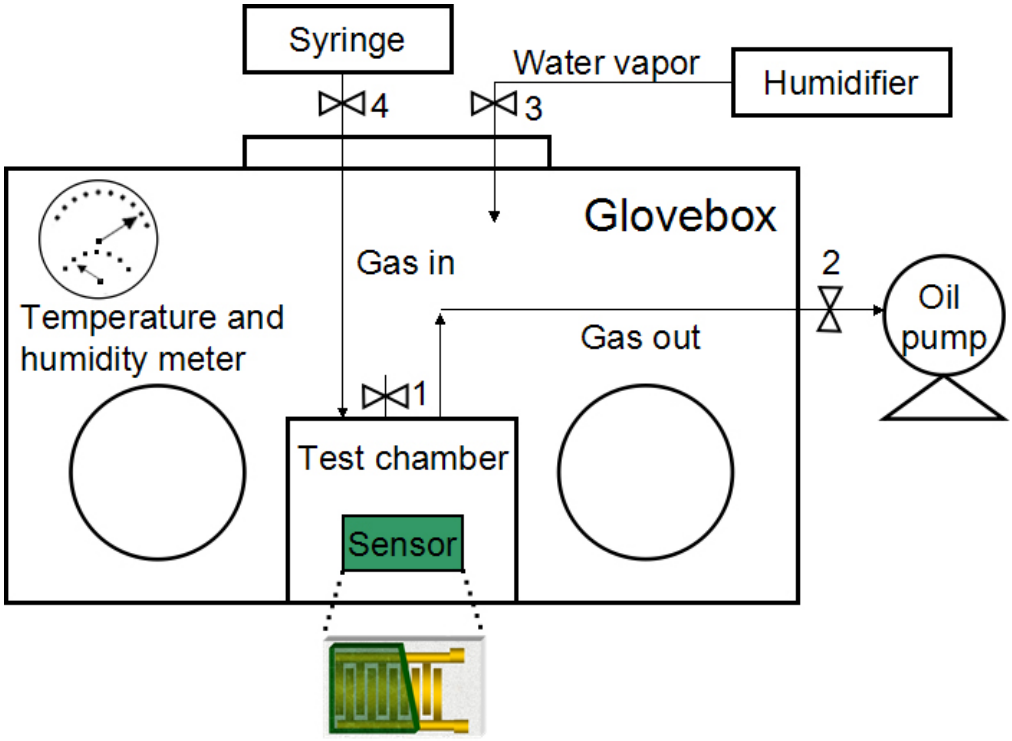

Fig. S4 A diagram of the gas delivery system for the gas sensing process

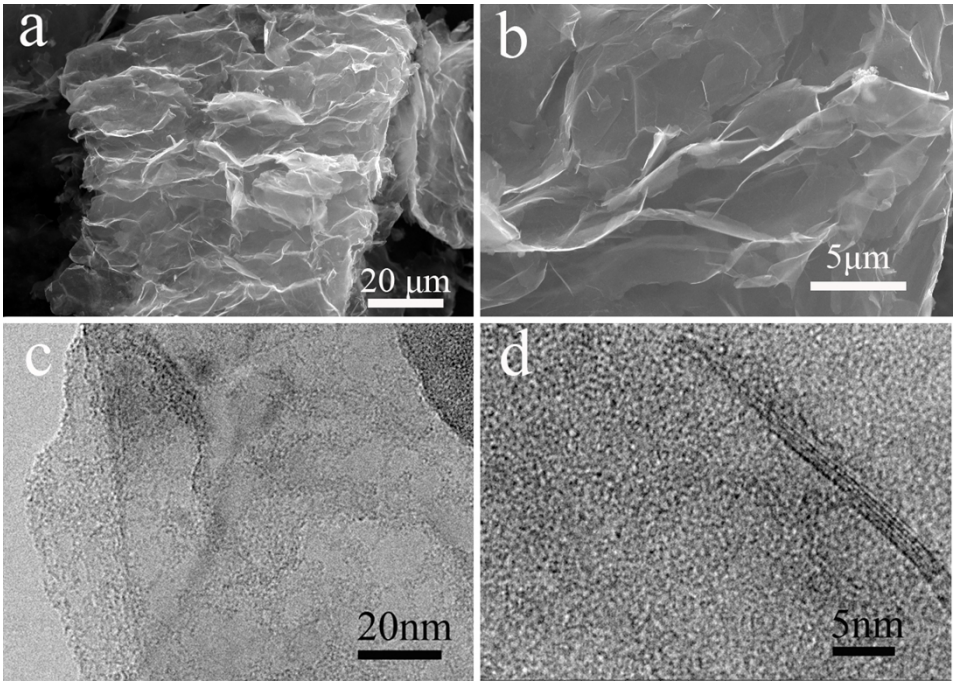

Fig. S5 (a, b) SEM images of activated expanded graphite (aEG) showing the accordion-like structure; (c, d) TEM images of aEG with many pores on the its surface

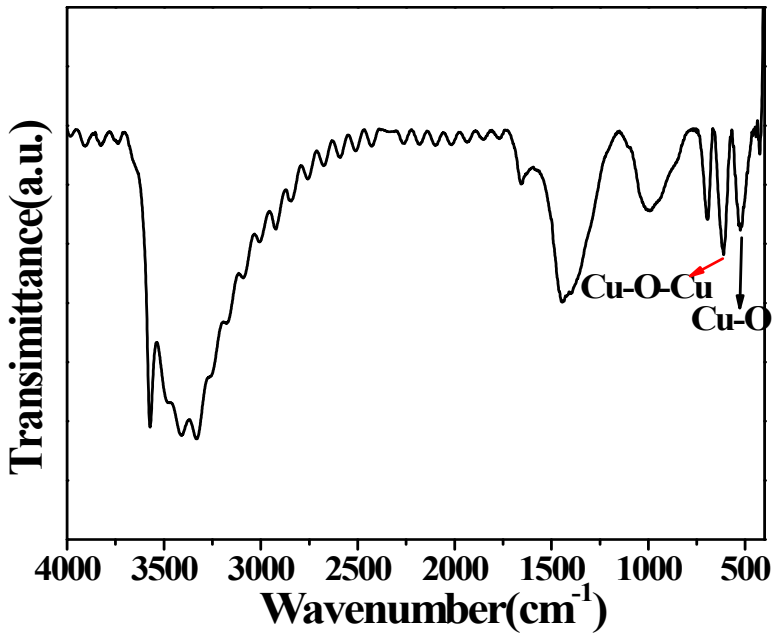

Fig. S6 IR spectrum of the CuGNC2

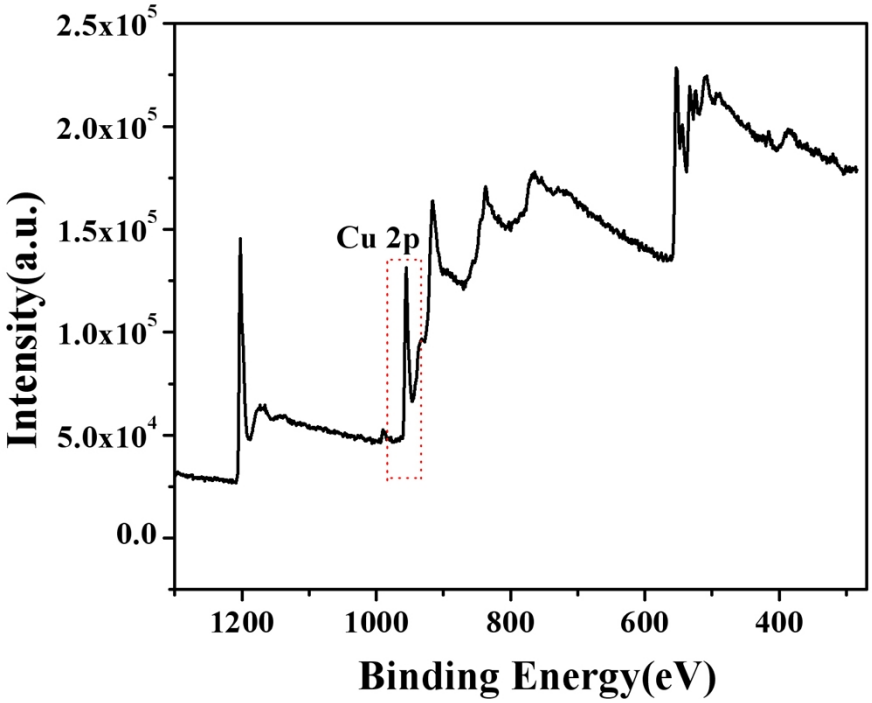

Fig. S7 Broad XPS spectrum of the CuGNC2

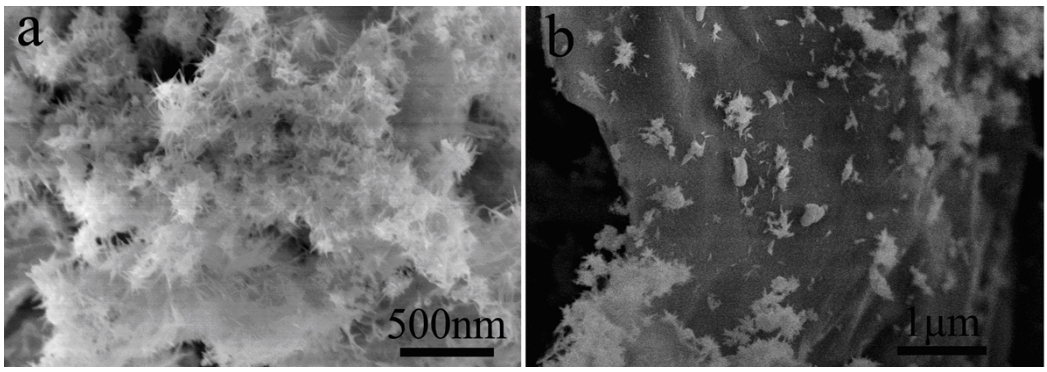

Fig. S8 SEM images of (a) CuMGC11 (aEG, 5 mg) and (b) CuMGC3 (aEG, 20 mg)

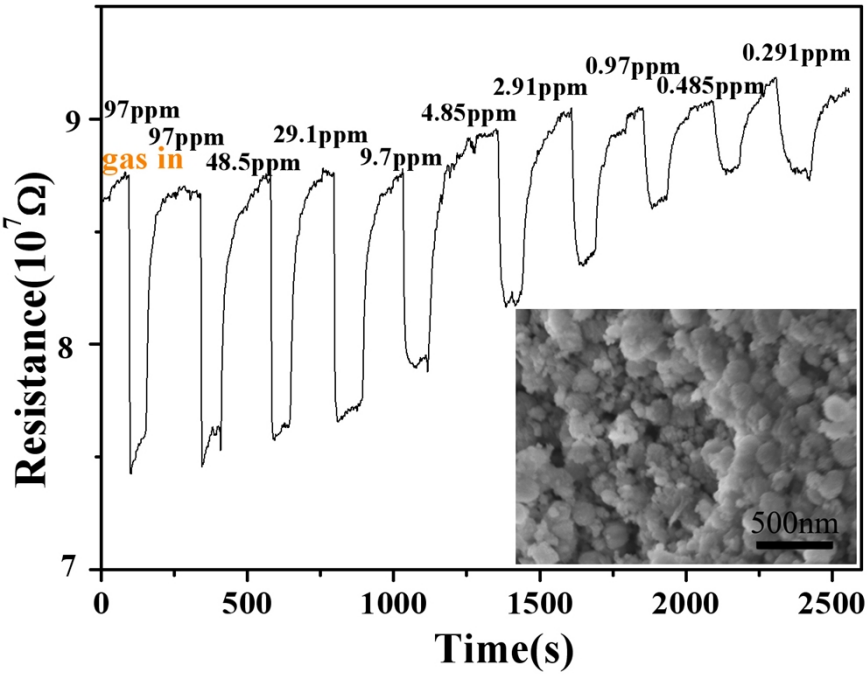

Fig. S9 Typical response curves of the Cu_xO sensor to 97~0.97 ppm NO_x at room temperature, the inset SEM image of the prepared Cu_xO

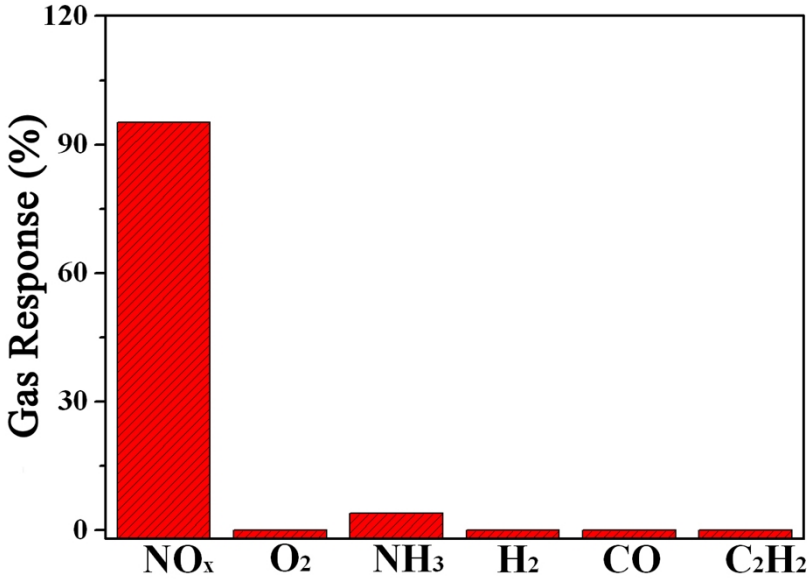

Fig. S10 Response of the CuGNC2 sensor to 97.1 ppm different gases at room temperature in air

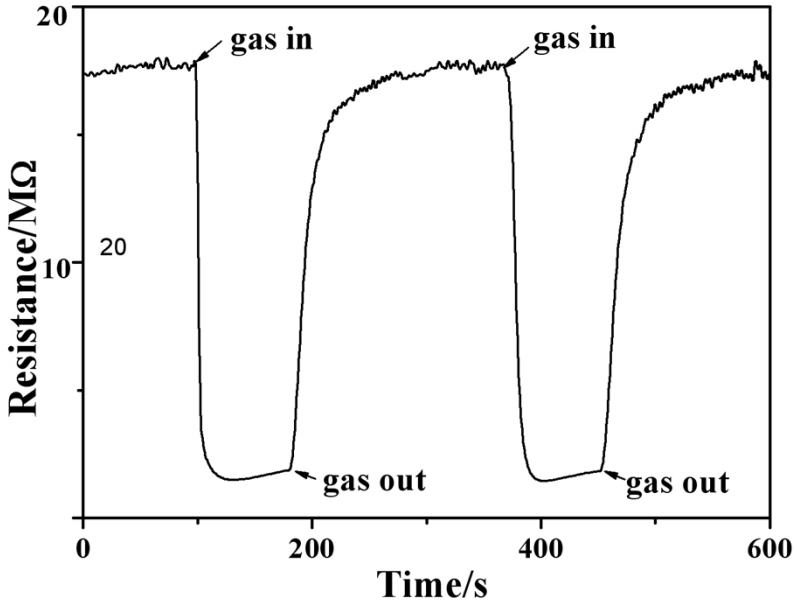

Fig. S11 Typical response curves of the CuGNC2 sensor to 48.5 ppm NO_x at room temperature

Table. S1 The gas response and response time of the Cu_xO sensor to 97~0.97 ppm NO_x at room temperature in air

C/ppm	97.0	48.5	29.1	9.70	4.85	2.91	0.97	0.485	0.097
Gas Response(%)	13.9	13.5	12.6	10.5	8.2	7.4	4.4	2.6	----
Response time/s	2	2	3.3	6.7	10.7	13.3	19.3	24	----

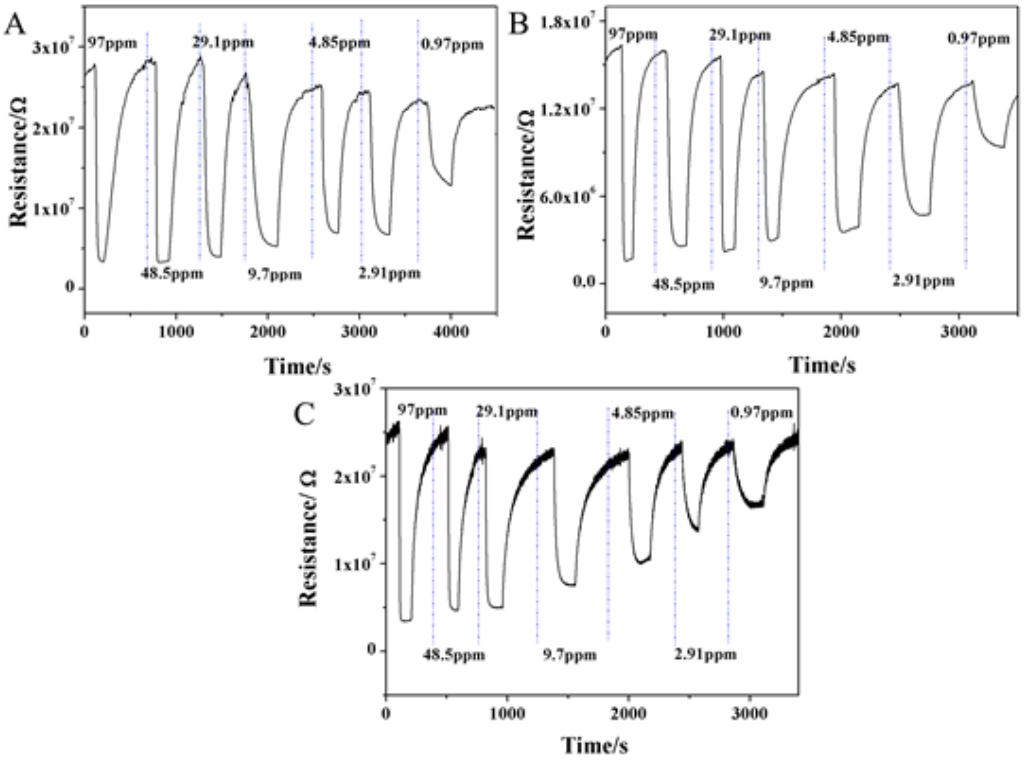

Fig. S12 The dynamic response- recovery curve of the CuMGC2 sensor to 97 ppm~97 ppb NO_x at room temperature in the different RH (A) 41%, (B) 62 % and (C) 80 %

Tab. S2 The gas response of the CuMGC2 sensor to 97 ppm~97 ppb NO_x at room temperature in the RH range of 26 ~ 80 %

C/ppm	97.0	48.5	29.1	9.70	4.85	2.91	0.97
Gas Response at 26 % RH	95.1%	93.1%	88.0%	77.9%	70.4%	62.5%	55.1%
Gas Response at 41 % RH	92.7%	92.1%	87.1%	80.6%	73.2%	68.5%	43.5%
Gas Response at 62 % RH	90.3%	83.5%	84.2%	78.8%	70.6%	63.3%	30.3%
Gas Response at 80 % RH	89.0%	82.2%	79.7%	68.6%	57.8%	43.4%	30.1%