

Supplementary material

PtPd NPs functionalized metal-organic framework-derived α -Fe₂O₃ porous spindles for low-temperature efficient detection of triethylamine

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Table. S1. Content of samples S1-S6

Sample	α -Fe ₂ O ₃ (wt%)	Pt (wt%)	Pd (wt%)
S1	100	0	0
S2	100	1.35	0.15
S3	100	1.425	0.075
S4	100	1.275	0.225
S5	100	1.5	0
S6	100	0	1.5

Table. S2. The O1 s XPS spectrum fitting results of the four samples.

Oxygen Species	Peak (eV)	S1	S2	S5	S6
O _L	528.4~528.7	29.58%	22.00%	25.00%	27.31%
O _V	529.8~530.0	32.12%	49.95%	48.50%	45.74%
O _C	531.6~532.0	38.30%	28.05%	26.50%	26.95%

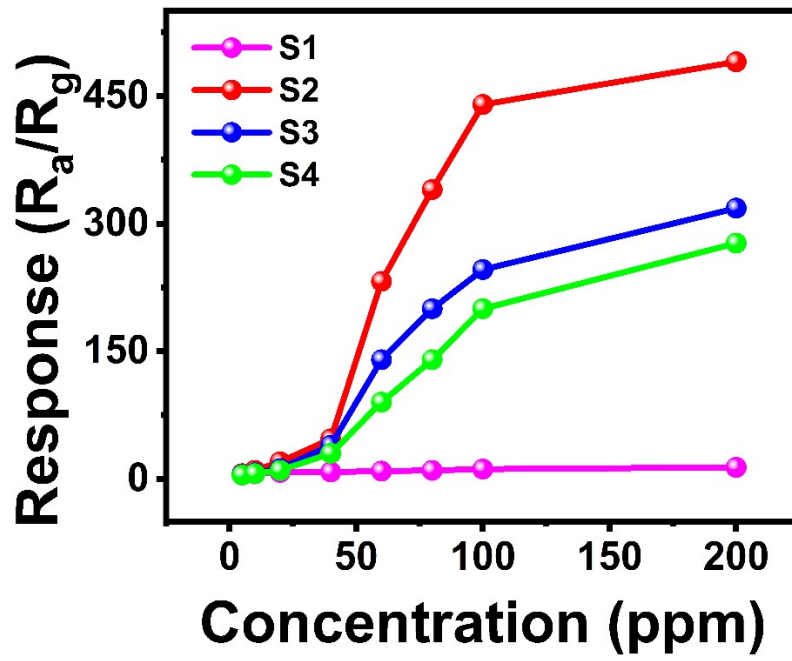


Fig. S1. The responses of the four materials at different concentrations of triethylamine.

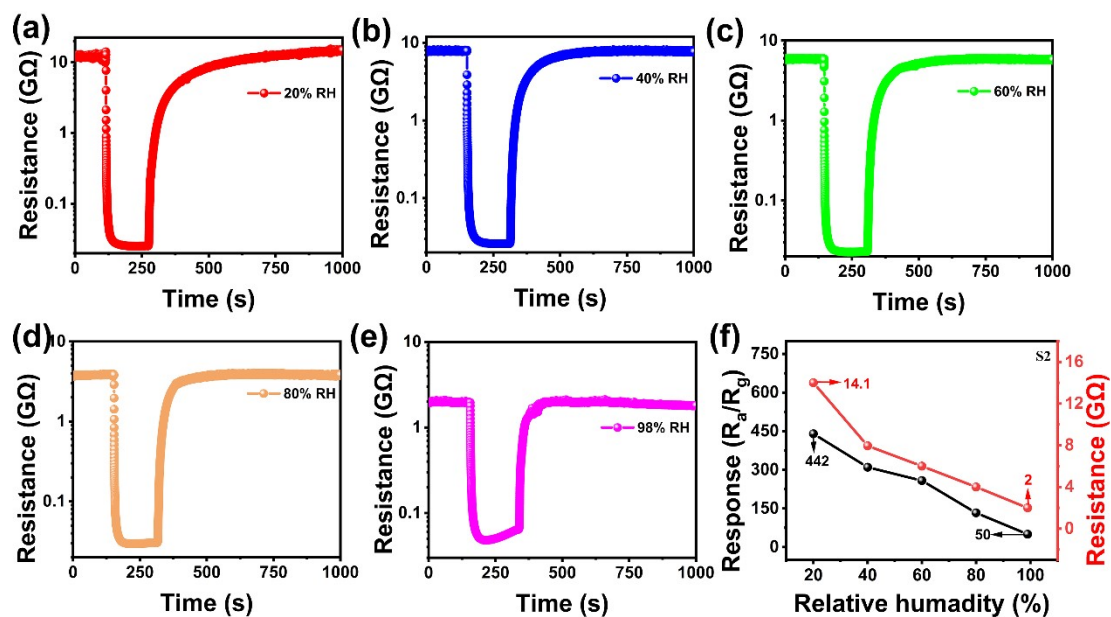


Fig. S2. (a-e) Dynamic response curves of the S2 to 100 ppm TEA for varying humidity conditions (20%, 40%, 60%, 80%, and 98% RH, 30°C) at 150°C, (f) Change in resistance and response with increasing humidity.

To further evaluate the sensing performance of the S2 sensor to humidity, the resistance curves of the S2 sensor to 100 ppm TEA were measured at 20% RH, 40% RH, 60% RH, 80% RH, and 98% RH (Fig. S2(a-e)). Fig. S2(f) shows the response and resistance of the S2 sensor with varied humidity, where the resistance decreases from 14.1 GΩ to 2 GΩ and the response decreases from 442 to 50, and the response were 442, 310, 258, 133, 50 under each relative humidity. The decrease in resistance and response is mainly due to the reaction of water vapor with the adsorbed oxygen molecules, which reduces the band bending and hinders the reaction of TEA with the sensing material[1]. Gas sensors are used in situations where the humidity does not exceed 60% RH in general. The response of the sensor in this work was achieved 258 under 60% RH. However, in order to improve the moisture resistance of the sensor, some moisture resistance techniques still need to be applied in subsequent research.

[1] P.F. Cheng, F. Dang, Y.L. Wang, J.N. Gao, L.P. Xu, C. Wang, et al., Gas sensor towards n-butanol at low temperature detection: Hierarchical flower-like Ni-doped Co_3O_4 based on solvent-dependent synthesis, *Sens Actuator B-Chem* 328(2021) 12.