Supporting Information

Vertically Aligned PANI Nanorod Arrays Grown on Graphene Oxide Nanosheets for a High-Performance NH_3 Gas Sensor

Jinwei Wei, [a] Bo Liang, [a] Qingpeng Cao, [a] Chentian Mo, [a] Youming Zheng, [b] and Xuesong Ye *[ac]

[a] Biosensor National Special Laboratory, College of Biomedical Engineering and Instrument Science, Zhejiang University, Hangzhou 310027, PR China

[b] Department of Technical Information, Zhejiang Provincial Museum, Hangzhou 310007, PR China

[c] State Key Lab of CAD&CG, Zhejiang University, Hangzhou 310027, PR China

* Corresponding author: Tel.: +86 0571 87951090; Fax: +86 0571 87952756.

Email address: yexuesong@zju.edu.cn.

For better readability, a list of the abbreviations used in the paper was summarized here.

- GO: Graphene Oxide;
- RGO: Reduced Graphene Oxide;
- PANI: Polyaniline;
- PNrA: PANI Nanorod Arrays;
- PNF: PANI Nanofibers;
- PNF/GO: PANI Nanofibers/GO nanosheets nanocomposite;
- PNrA/GO: PANI Nanorod Arrays/GO nanosheets nanocomposite;
- PNrA/GO (5.2:1), PNrA/GO (3.9:1), PNrA/GO (2.6:1), PNrA/GO (1.3:1): PNrA/GO synthesized at different weight ratio of anline to GO as 5.2:1, 3.9:1, 2.6:1 and 1.3:1;
- PNrA/GO_1X, PNrA/GO_10X, PNrA/GO_20X: PNrA/GO diluted by deionized water in different volume ratio as 1:1, 1:10 and 1:20;
- S1, S2: Gas Sensor 1, Gas Sensor 2, fabricated in the same batch.

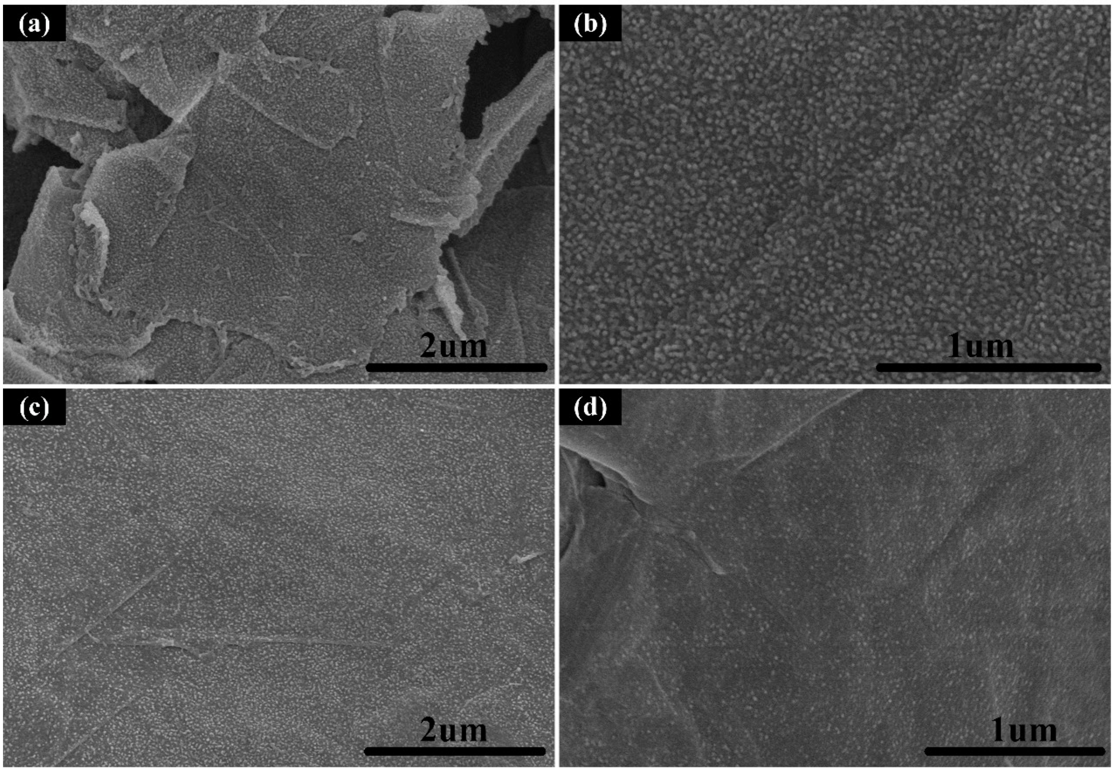

Fig. S1. SEM images of PNrA/GO synthesized at different concentration of aniline: (a) 0.02 M; (b) 0.015 M; (c) 0.01M; (d) 0.005 M. The weight ratio of aniline to GO in synthesized suspension was 5.2:1, 3.9:1, 2.6:1 and 1.3:1, respectively.

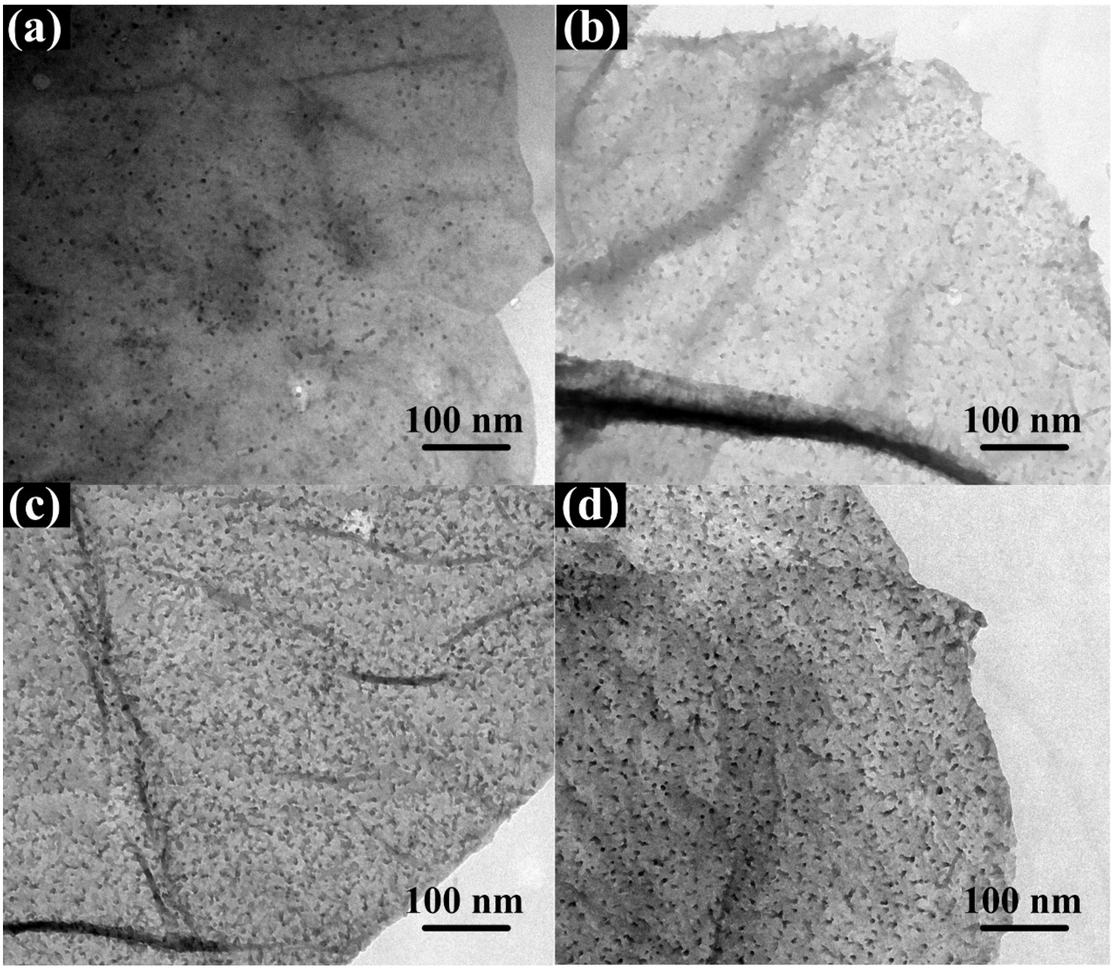

Fig. S2. TEM images of PNrA/GO obtained at different reaction periods: (b) 1h; (c) 4h; (d) 8h; (e) 24h.

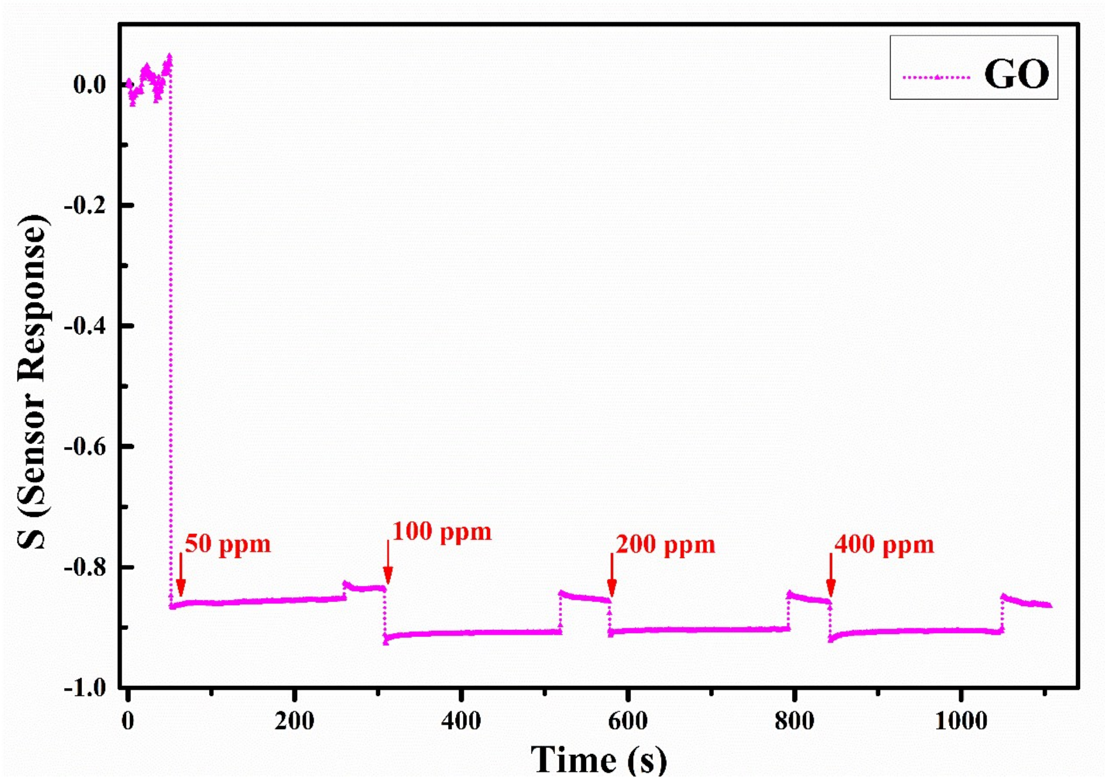

Fig. S3. Gas response behaviors based on graphene oxide (GO) towards 50, 100, 200 and 400 ppm of NH_3 in sequence at room temperature. And it is a magnified view of GO response to NH_3 molecules in Fig. 5a.

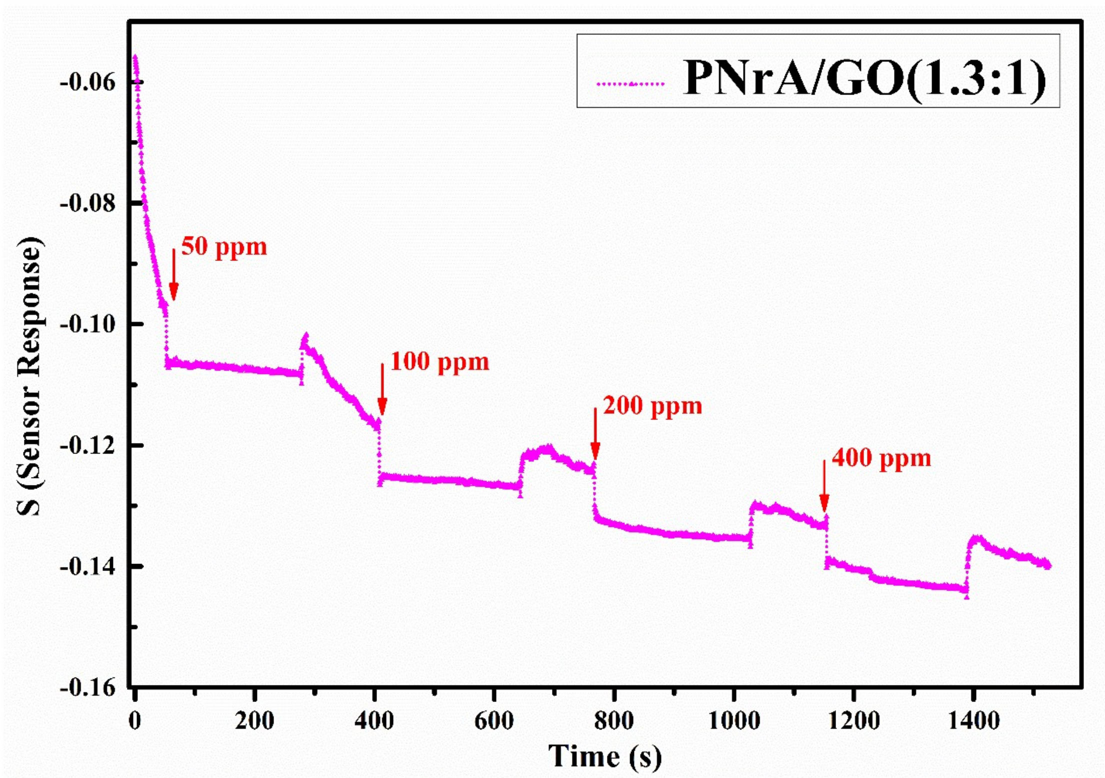

Fig. S4. Gas sensitivity on exposure to 50, 100, 200 and 400 ppm NH_3 of PNrA/GO synthesized at weight ratio of aniline to GO: 1.3:1. And it is a magnified view of PNrA/GO (1.3:1) response to NH_3 molecules in Fig. 5b.

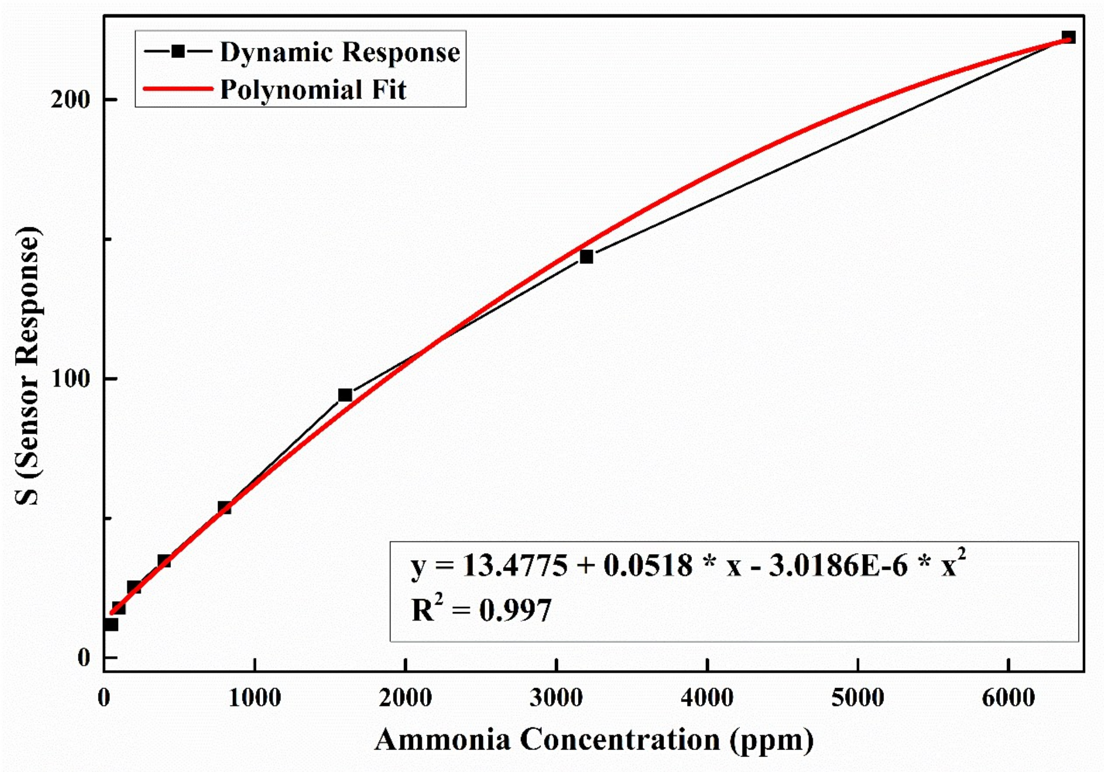

Fig. S5. Dynamic response and its polynomial fitting of the ammonia sensor to different concentrations of NH_3 ranging from 50 ppm to 6400 ppm. $R^2 = 0.997$.

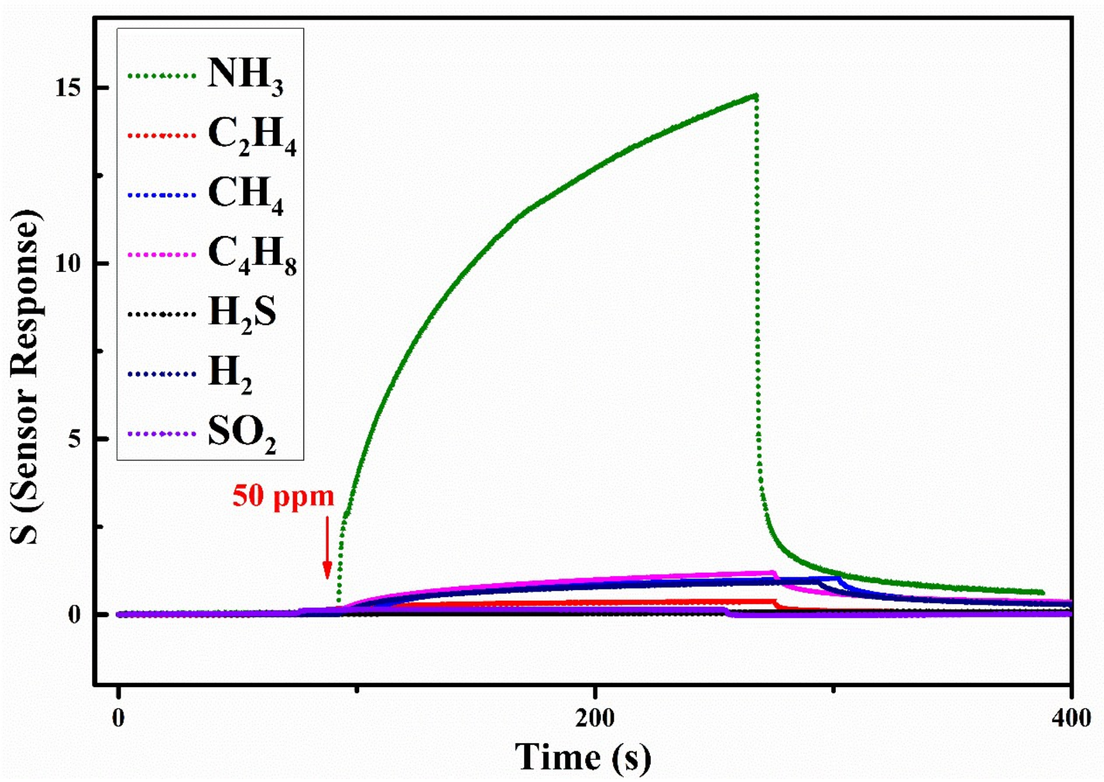

Fig. S6. Gas sensing behaviors of the ammonia sensor to various interfering gas species at concentration of 50 ppm, including NH_3, C_2H_4, CH_4, C_4H_8, H_2S, H_2 and SO_2.

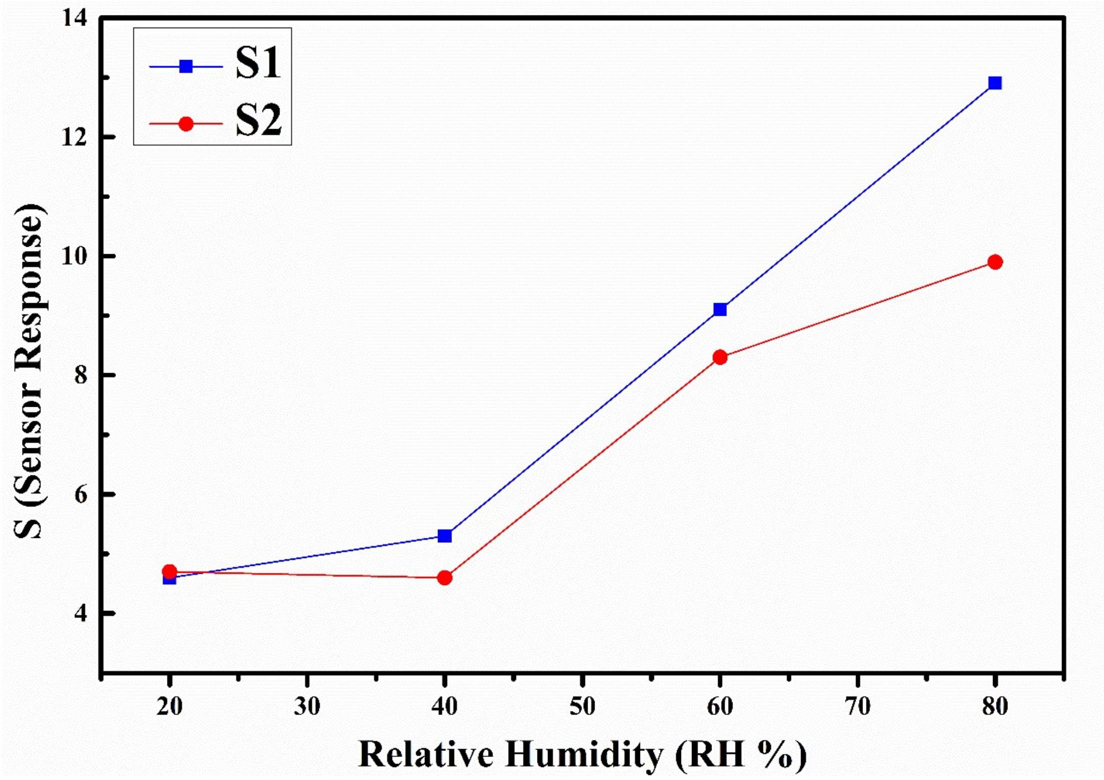

Fig. S7. Sensitivity changes of gas sensor S1 and S2 under various RH levels. And sensor S1 and sensor S2 were fabricated in the same batch.

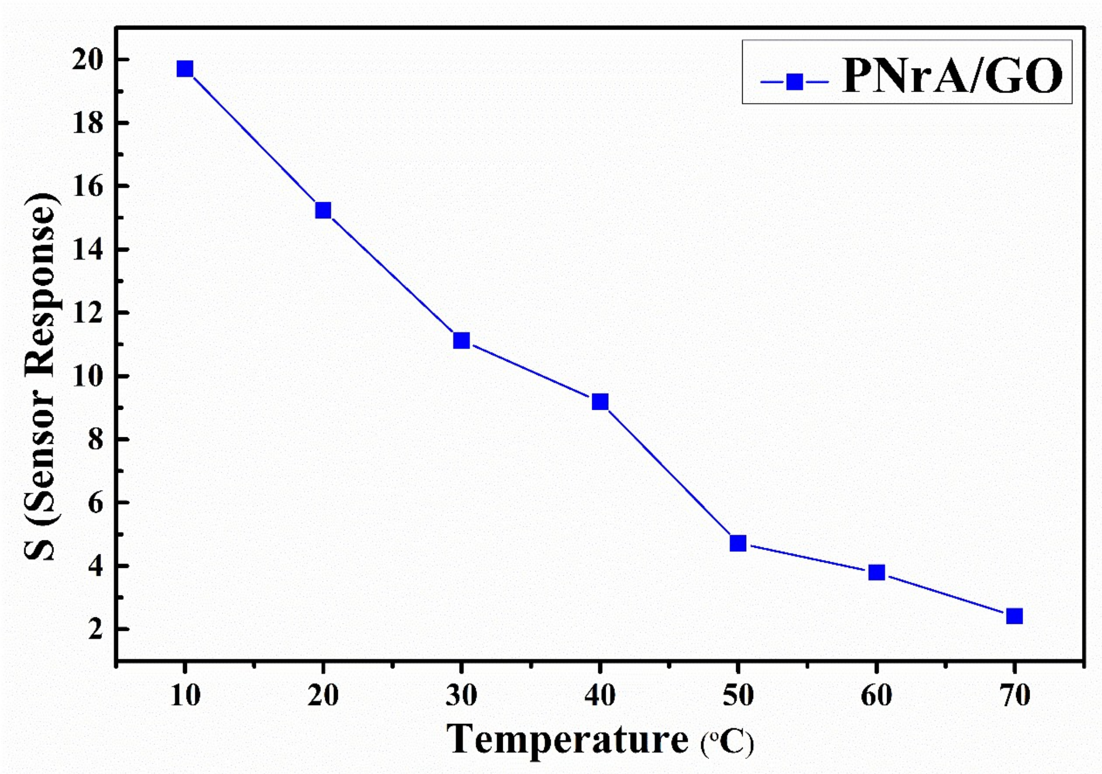

Fig. S8. Sensitivity changes of the ammonia sensor under various working temperatures from 10 °C to 70 °C.