

Supporting information

CuO Nanostructure-Decorated InGaN Nanorods for Selective H₂S Gas Detection

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The top-view of InGaN NRs and the elemental mapping of InGaN NRs is shown in Figure S1.

It was noticed that an inhomogeneous distribution of the In composition in the InGaN NRs.

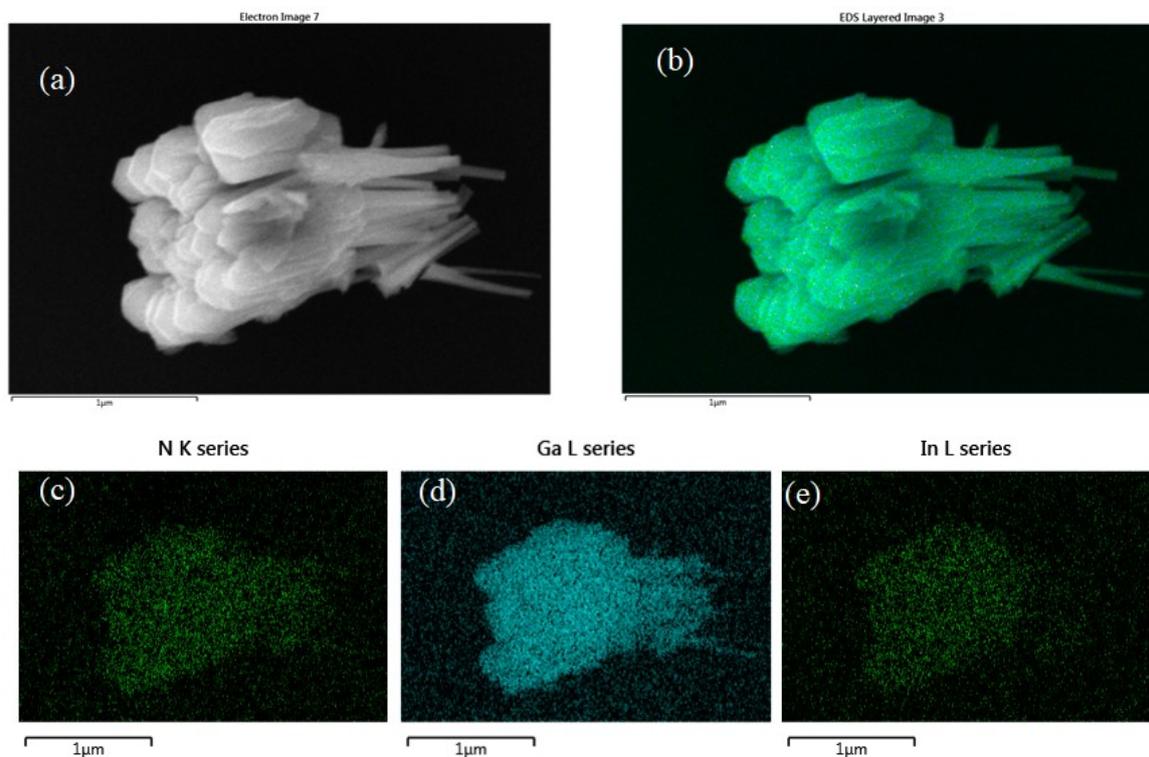


Figure S1. (a) Top-view SEM image of the individually separated nanorod, (b) The elemental mapping of InGaN NRs, (c)N (d) Ga, and (e) In

Figure 2S shows the cross-sectional SEM with EDS line profile from funnel-like shaped InGaN NRs, which offers evidence of the composition nonuniformity of InGaN NRs. The indium composition in the rod shape InGaN NRs and Funnel shaped InGaN NRs are 3, and 10 % respectively as shown in CPS.

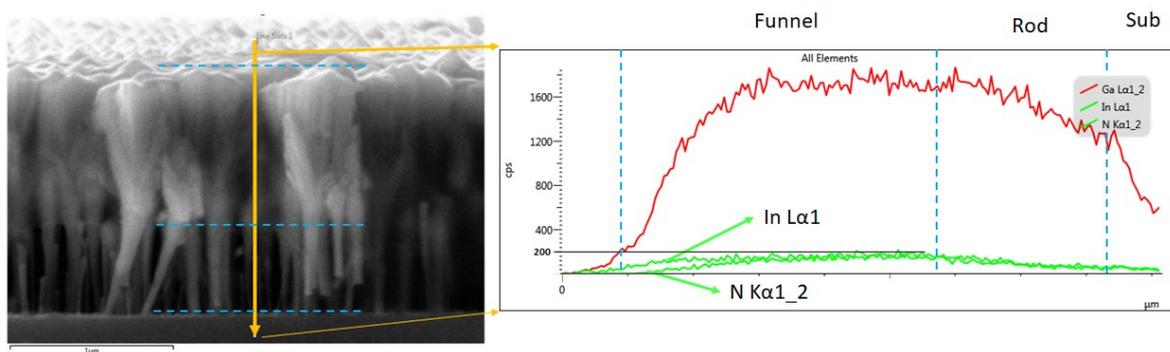


Figure S2. (a) The cross-sectional SEM images of InGaN NRs, and the corresponding EDS line profile measured from a single long InGaN NRs.

Figure S3(a-b) shows the EDS spectra of the popcorn-shaped CuO nanostructures. The EDS spectra of both structures reveal that both products are composed of Cu and O in a 51:49 ratio. Fig. S3(b) shows the EDS spectra of the p-CuO/n-InGaN NRs, which further illustrates the integration of the p-CuO and n-InGaN NRs.

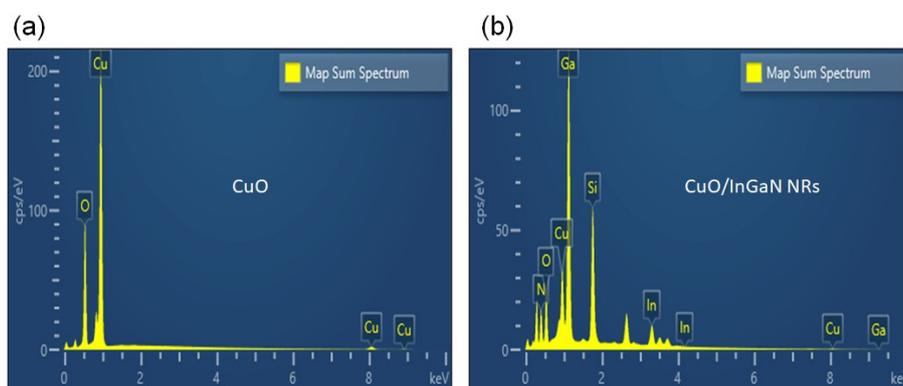


Figure S3 The EDS spectra for (a) CuO, and (b) CuO/InGaN NRs.

Next, popcorn-shaped CuO nanostructure-decorated InGaN NRs were exposed to five repeatable pulses of 100 ppm of H₂S gas, as shown in Figure S4 (a). Their performance is quite stable without any response deviations for all five repeated cycles (Figure. S4 (b)). Also, the popcorn-CuO/InGaN NR sensor exhibits a larger response than has been discussed in most

previous reports at room temperature (Table S1)

Table S1 Comparison of the performance of our device with the previous reports at RT.

Ref.	Material	Temperature (°C)	Target gas	Response (%)
1	CuO nanoparticles	80	H ₂ S	9.8 (10 ppm)
2	H ₂ treated-AlGaIn/GaN HEMT	250	H ₂ S	15 (90 ppm)
3	CdS quantum dots/Co ₃ O ₄ HMSs	RT	H ₂ S	12.7 (100 ppm)
4	PPy/WO ₃	RT	H ₂ S	5.25 (1 ppm)
5	Pt-gated AlGaIn/GaN HEMT	250	H ₂ S	22.1 (90 ppm)
6	IZO	RT	H ₂ S	12.3 (1 ppm)
Our work	Popcorn-CuO/InGaIn NRs	RT	H ₂ S	35.45 (100 ppm)

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