Graphene and Graphene Oxide Double Decorated SnO₂ Nanofibers with Enhanced Humidity Sensing Performance

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Figure S1

Figure S1 (A) SEM images of graphene. (B) Raman spectra of graphene.

Fig S2

Figure S2 shows the typical FTIR spectrum of GO sheets. The spectrum presence of different type of oxygen functionalities in graphene oxide was confirmed at 3400 cm⁻¹
(O-H stretching vibrations), at 1720 and 1576 cm$^{-1}$ (stretching vibrations from C–OH vibrations from COOH and H$_2$O), and at 1060 cm$^{-1}$ (C-O stretching vibrations). The peaks at $\sim$2336 cm$^{-1}$ is due to atmospheric CO$_2$.

Fig S3

![XRD patterns of pure SnO$_2$ and SnO$_2$@G composites.](image)

**Figure S3** The XRD patterns of pure SnO$_2$ and SnO$_2$@G composites. For SnO$_2$ nanofibers, all the peaks can be readily indexed to the rutile phase SnO$_2$ (JCPDS No. 41-1445). Compared to pure SnO$_2$ nanofibers, in the XRD pattern of SnO$_2$@G nanofibers, the appearance of a broadened peak at 24° (inset) corresponding to the (002) of graphite indicates the existence of graphene.

Figure S4

![SEM images of SnO$_2$ nanofibers.](image)
**Figure S4** (A) SEM images of as-spun SnO$_2$@G nanofibers, and (B) SEM images of SnO$_2$@G nanofibers after annealing.

**Figure S5** (A) Nitrogen adsorption/desorption isotherms of the SnO$_2$@G-GO nanocomposite. The specific surface area of the SnO$_2$@G-GO nanocomposite is 193.62 m$^2$ g$^{-1}$. (B) Nitrogen adsorption/desorption isotherms of the SnO$_2$@G nanofibers. The specific surface area of the SnO$_2$@G nanofibers is 29.34 m$^2$ g$^{-1}$. The pore diameter is about 3.8nm.

**Figure S6**
**Figure S6** SEM images of SnO$_2$@G-GO. The SnO$_2$@G hybrid nanofibers were apparently wrapped by the well-stretched GO.

**Figure S7**

![Raman spectra](image)

**Figure S7** Raman spectra of (A) SnO$_2$@G nanofibers, and (B) SnO$_2$@G-GO nanocomposite.

**Figure 8**

![XPS spectra](image)

**Figure S8** XPS spectra of the SnO$_2$@G-GO nanocomposites (A); insets: the Sn 3d doublet; (B) the C 1s XPS spectrum of the graphene and GO.