

Figure S1. (a) Lower magnification SEM image of WS<sub>2</sub> microflakes, (b) lower magnification SEM image of Au/WS<sub>2</sub>-5.6 nanocomposites.

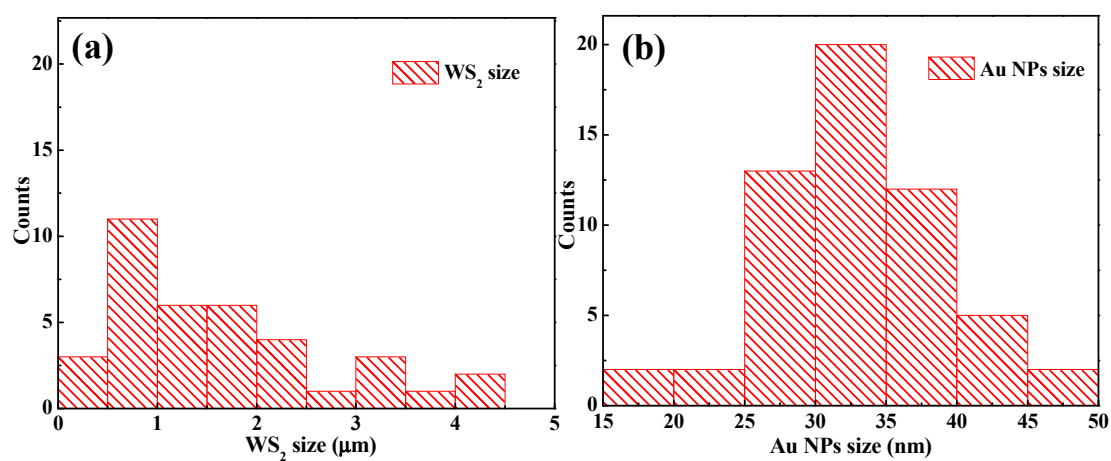
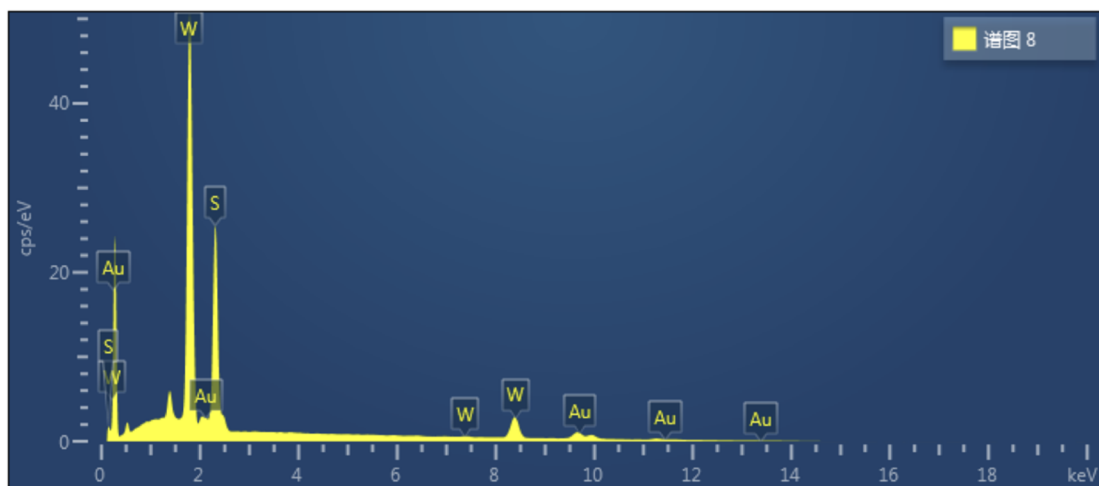


Figure S2. (a) Statistical size distribution of WS<sub>2</sub> microflakes, (b) statistical size distribution of Au-NPs.



Elements	Type of line	Weight percentage	Wt% Sigma	Atomic percentage
S	K	25.24	0.24	65.98
W	M	72.64	0.39	33.12
Au	M	2.13	0.43	0.9

Figure S3. EDS patterns of Au/WS<sub>2</sub>-5.6

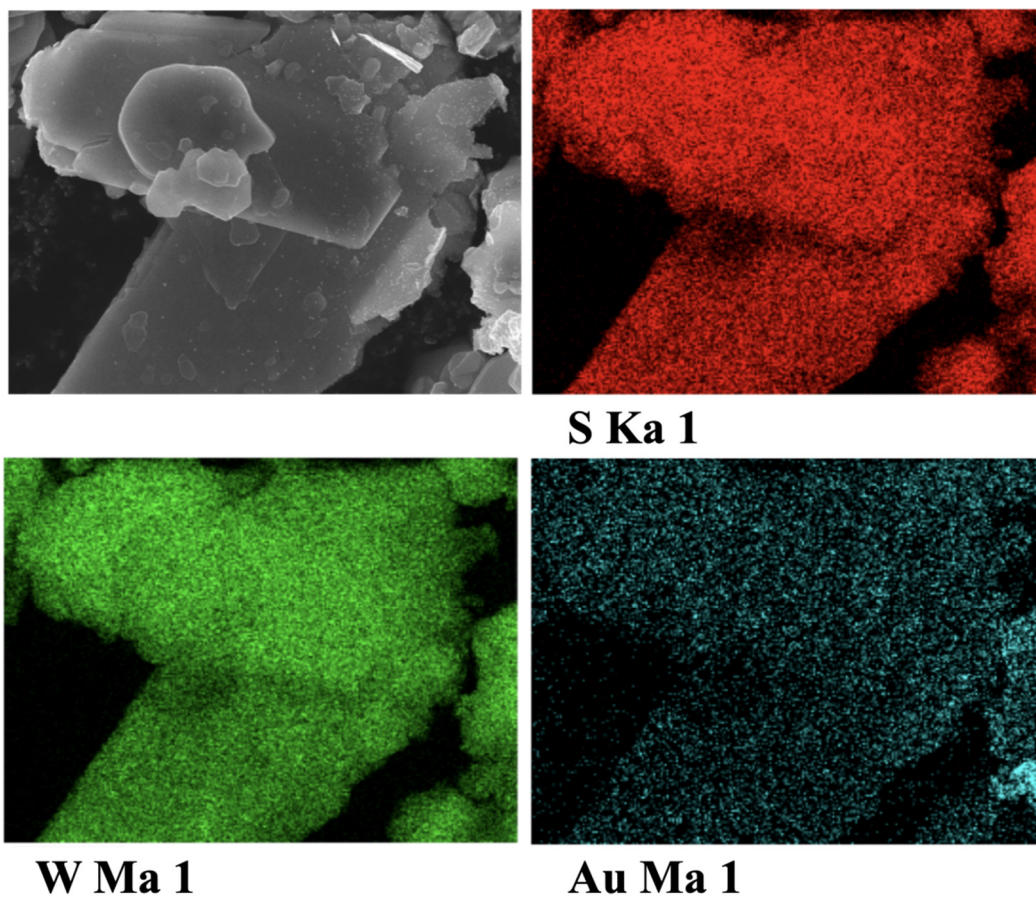


Figure S4. Elemental mapping images of Au/WS<sub>2</sub>-5.6

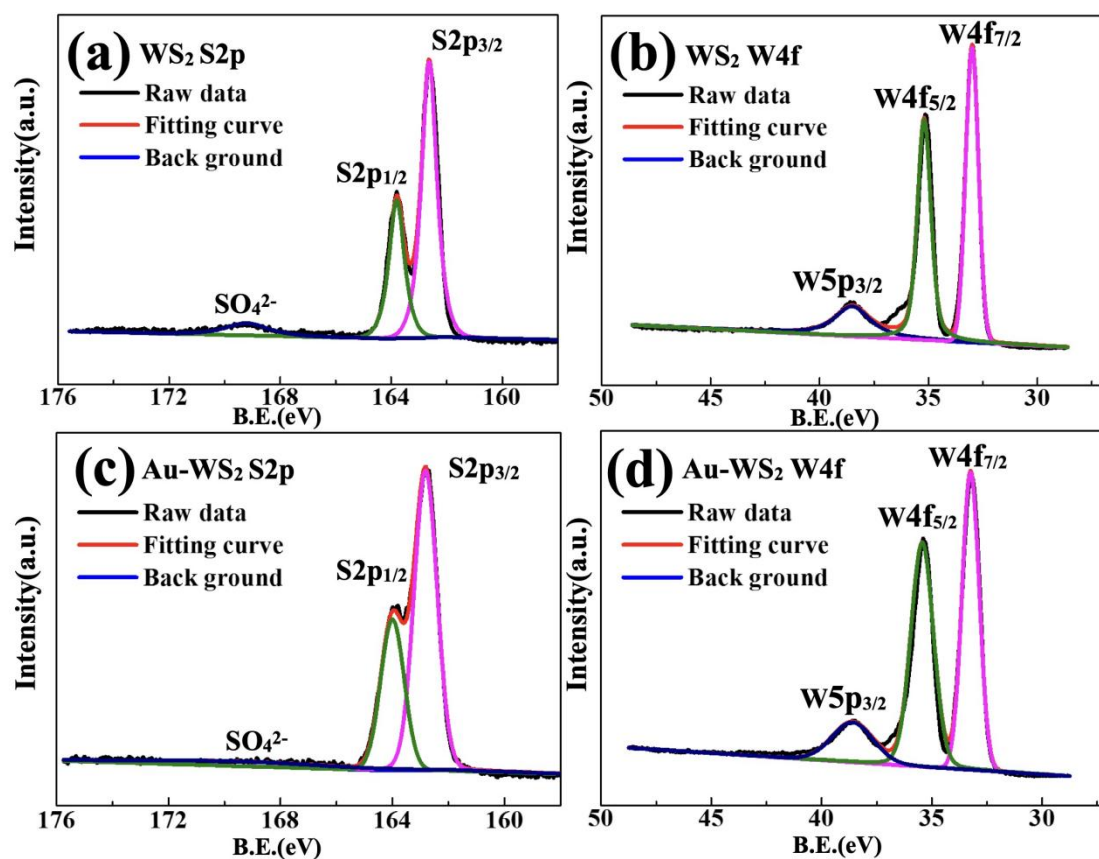


Figure S5. (a) S 2p of WS<sub>2</sub> microflakes, (b) W 4f of WS<sub>2</sub> microflakes, (c) S 2p of Au/WS<sub>2</sub>-5.6 nanocomposites, (d) W 4f of Au/WS<sub>2</sub>-5.6 nanocomposites.

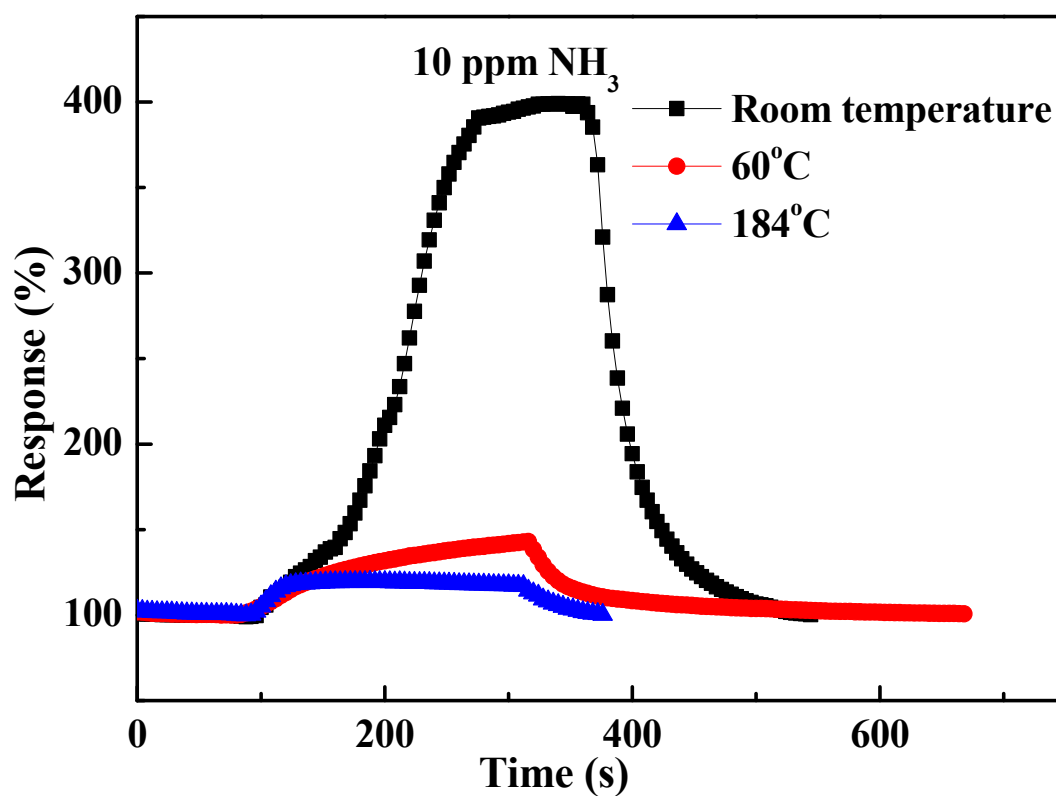


Figure S6. The Au/WS<sub>2</sub>-5.6 based gas sensor response beyond room temperature.