

## Supporting Information

### **Synthesis and enhanced gas sensing properties of Au-nanoparticle decorated CdS nanowires**

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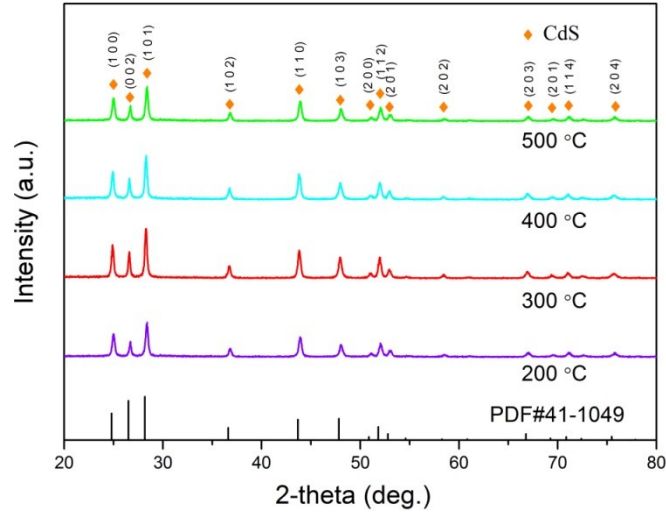


Figure S1. the XRD patterns for CdS NWs samples with different calcining temperatures

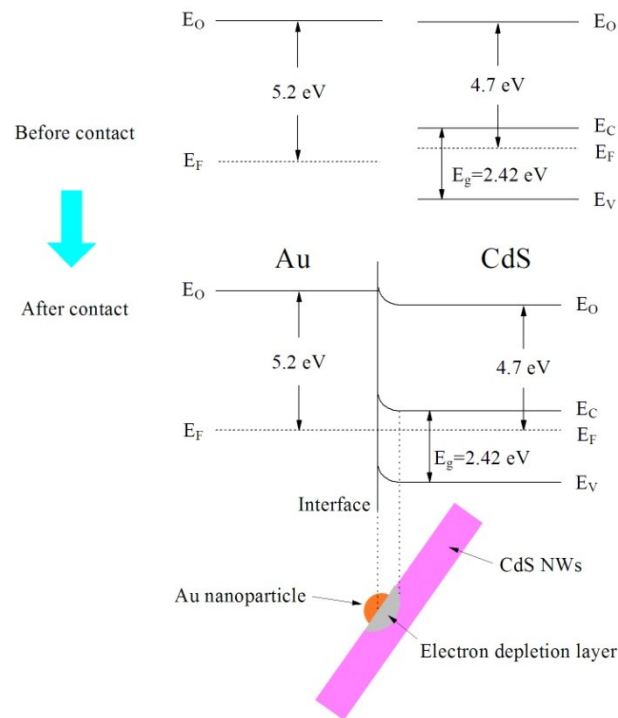


Figure S2. Energy level diagram for Au-CdS NW.

Due to the work function of Au (5.2 eV) is greater than that of CdS (4.7 eV), it is easy for electrons in CdS NW to transfer to Au nanoparticle which makes a decrease in concentration of conduction band electrons and results in the formation of electron depletion layer near the interface of Au nanoparticle and CdS NW. These electron depletion layers will shrink the conducting channel and make Au-CdS NWs show a high atmospheric resistance.

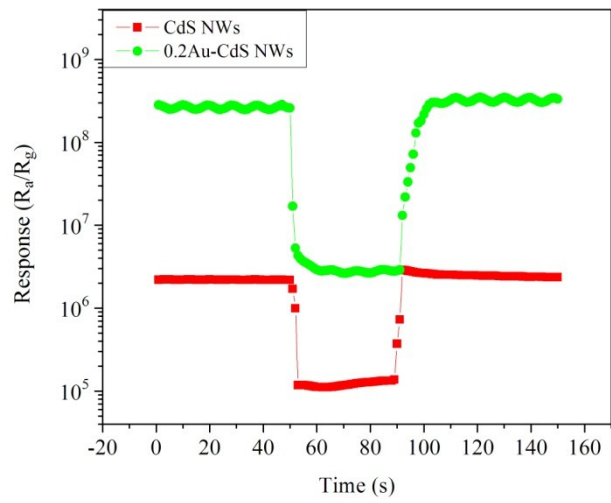


Fig. S3 Dynamic resistance curves of the sensors against 100 ppm ethanol.