Supporting Information

Plasmon-Exciton Interactions in Hybrid Structures of Au Nano-
hemispheres and CdS Nanowires for Improved Photoconductive
Devices

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**Fig. S1** Schematic diagram depicting the fabrication process of Au NH-CdS NW hybrid nanostructures on a transparent quartz substrate for the optical measurement. (a) Deposition of 8 nm-thick Au thin film as a catalyst layer on the quartz substrate by the thermal evaporation method. (b) Growth of CdS NWs in a vacuum furnace via a catalyst-assisted CVD method. (c) Deposition of Au NHs onto the CdS NWs. Here, 2.5 nm-thick Au film was deposited onto the CdS NWs, and the substrate was thermally annealed at 300 °C for 1 hour. The annealing process resulted in the formation of hemispherical Au nano-islands on the CdS NWs.

**Fig. S2** CdS NWs grown on a quartz crystal substrate using 8 nm-thick Au film as a catalyst. (a) SEM image. (b) Histogram of the diameter for the CdS NWs shown in (a). The average diameter and length of the CdS NWs were 48.5nm and 4 µm, respectively.

**Fig. S3** Au NHs on a quartz substrate. Here, 2.5 nm-thick Au film was first deposited on a quartz crystal substrate, and the substrate was annealed at 300 °C for 1 hour. (a) SEM image. (b) Histogram of the diameter for the Au NHs shown in (a). The average diameter of the Au NHs was 16 nm.
Fig. S4 Preparation of hybrid structures including aluminium oxide layer between Au NHs and CdS NWs. (a) Growth of CdS NWs via the catalyst-assisted CVD method using an Au film as a catalyst. (b) Deposition of an alumina layer on the surface of CdS NWs via the atomic layer deposition (ALD) method. The Al₂O₃ layers were deposited using an ALD process (Quros Company, plus-150) at 150 °C with trimethylaluminum and water. (c) Thermal deposition of Au NHs on the surface.

Fig. S5 Schematic diagram depicting the fabrication process of a photodetector based on the networks of Au NH-CdS NW hybrid nanostructures. (a) Growth of CdS NWs on a SiO₂ substrate (oxide thickness ~100 nm) using the catalyst-assisted CVD method. (b) Deposition of Au NHs by a thermal evaporation followed by a thermal annealing process at 300 °C for 1 hour. (c) Fabrication of metal electrodes (Ti/Au, 10 nm/30 nm) by the thermal evaporation through a shadow mask.

Fig. S6 Schematic diagram depicting the fabrication process of a photodetector based on the networks of Au NH-CdS NW hybrid structures on carbon nanotube channels. (a) Preparation
of carbon nanotube network patterns on SiO$_2$ substrate. Here, OTS was first patterned on the SiO$_2$ substrate by a photolithography method. Then, the substrate was dipped in the carbon nanotube suspensions so that the CNTs were selectively adsorbed onto bare SiO$_2$ regions. (b) Deposition of CdS NW networks. First, Au film was deposited on a selected region of the CNT channel using a shadow mask. Then, CdS NWs were selectively grown on the Au catalyst patterns via the CVD method. (c) Deposition of Au NHs on the surfaces of CdS NWs by the thermal evaporation method. (d) Preparation of metal electrodes (Ti/Au, 10 nm/30 nm) by the thermal evaporation through a shadow mask.