Electronic Supplementary Information

Synthesis and Characterization of Carbon Nanotubes Supported Au Nanoparticles Encapsulated in Various Oxide shells

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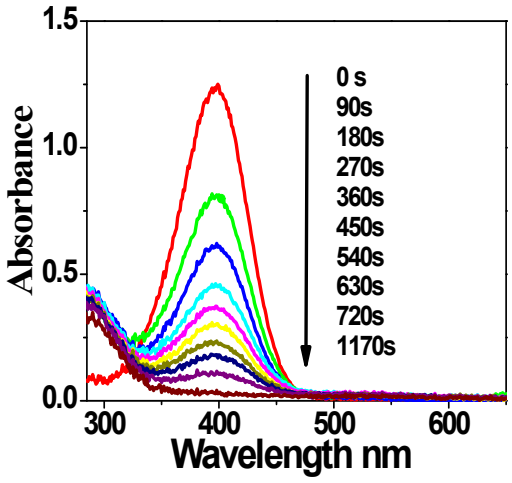

Fig.S1 Successive UV-visible absorption spectra of p-NPh solution reduced by $NaBH_4$ in the catalyst of Au/CNTs calcined at 400 °C for 4 h.

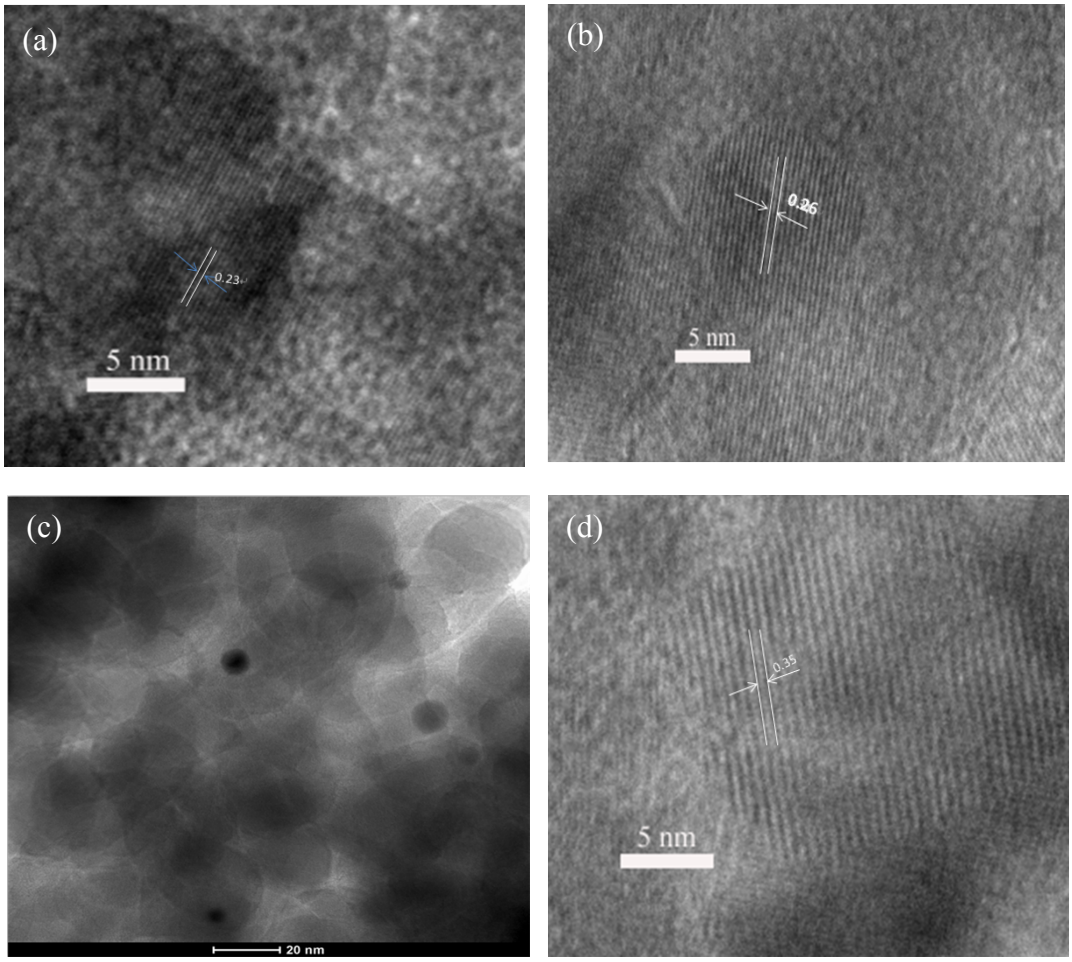

Fig.S2 High resolution (HRTEM) for (a) Au nanoparticles, (b) ZnO/Au/CNTs, (c) SiO_2/Au/CNTs, (d) TiO_2/Au/CNTs catalysts treated at 400 °C for 4 h.

The lattice fringe of d = 0.23 nm matches that of (1 1 1) crystallographic plane of Au phase (Fig. S2a). Similarly, Fig. S2b shows the lattice space of d=0.26 nm agrees well with the (002) planes of hexagonal wurtzite ZnO. Fig. S2d shows a single TiO_2 nanoparticle. The crystal lattice displace is around 0.35 nm, which is attributed to the anatase phase.

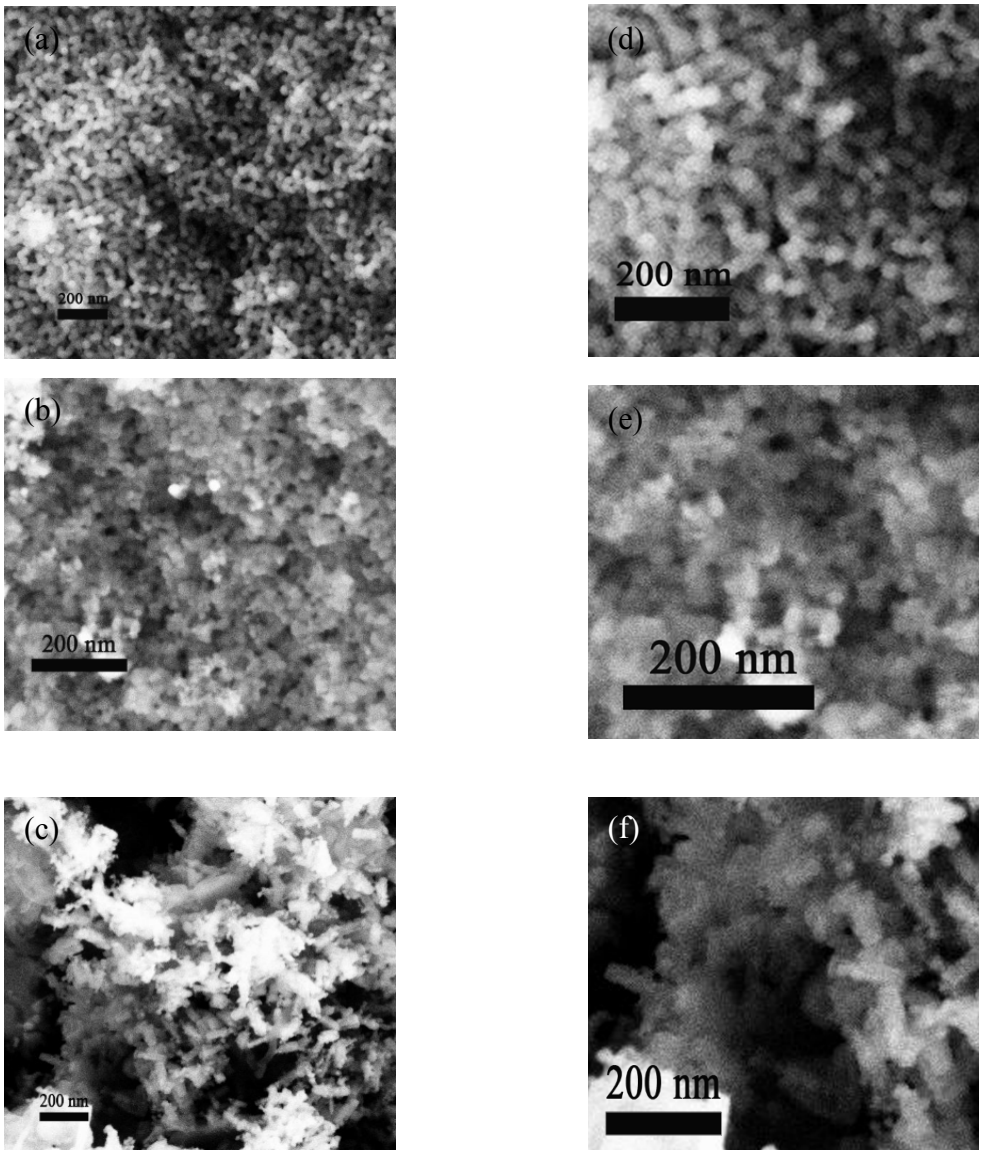

Fig.S3 Field emission scanning electron microscopy (FESEM) for (a) SiO_2/Au/CNTs, (b) TiO_2/Au/CNTs, (c) ZnO/Au/CNTs samples calcined at 400 °C for 4 h. (d)-(f) are the corresponding enlarged images.

From the images, it can be clearly seen that the carbon nanotubes was cut off to many small segments. It was mainly because in the process of pre-treatment, the MWCNTs was treated by mixed acid (concentrated sulfuric acid and concentrated nitric acid with the volume ratio is 1:1).