

Supporting Information

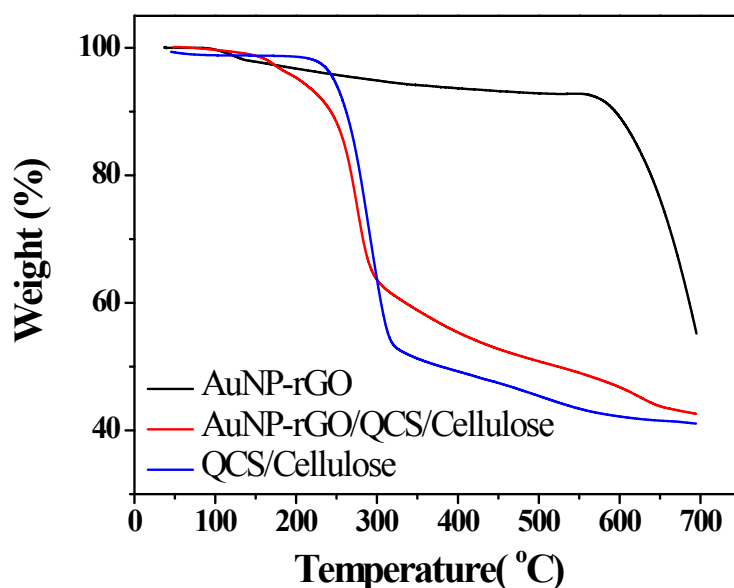


Fig. S1. TGA curves of AuNP-rGO, AuNP-rGO/QCS/Cellulose and QCS/Cellulose composite.

Thermal gravimetric analysis (TGA) was used to analyze the content of AuNP-rGO in AuNP-rGO/QCS/Cellulose composite. The most mass loss for the AuNP-rGO composite was from 600 °C to 700 °C, while in this temperature range, degradation curve for QCS/Cellulose composite reached its balance. Therefore, the degradation curve of AuNP-rGO/QCS/Cellulose in the temperature scope from 600 °C to 700 °C are mainly ascribed to AuNP-rGO degradation and its content was estimated around 4.16%.

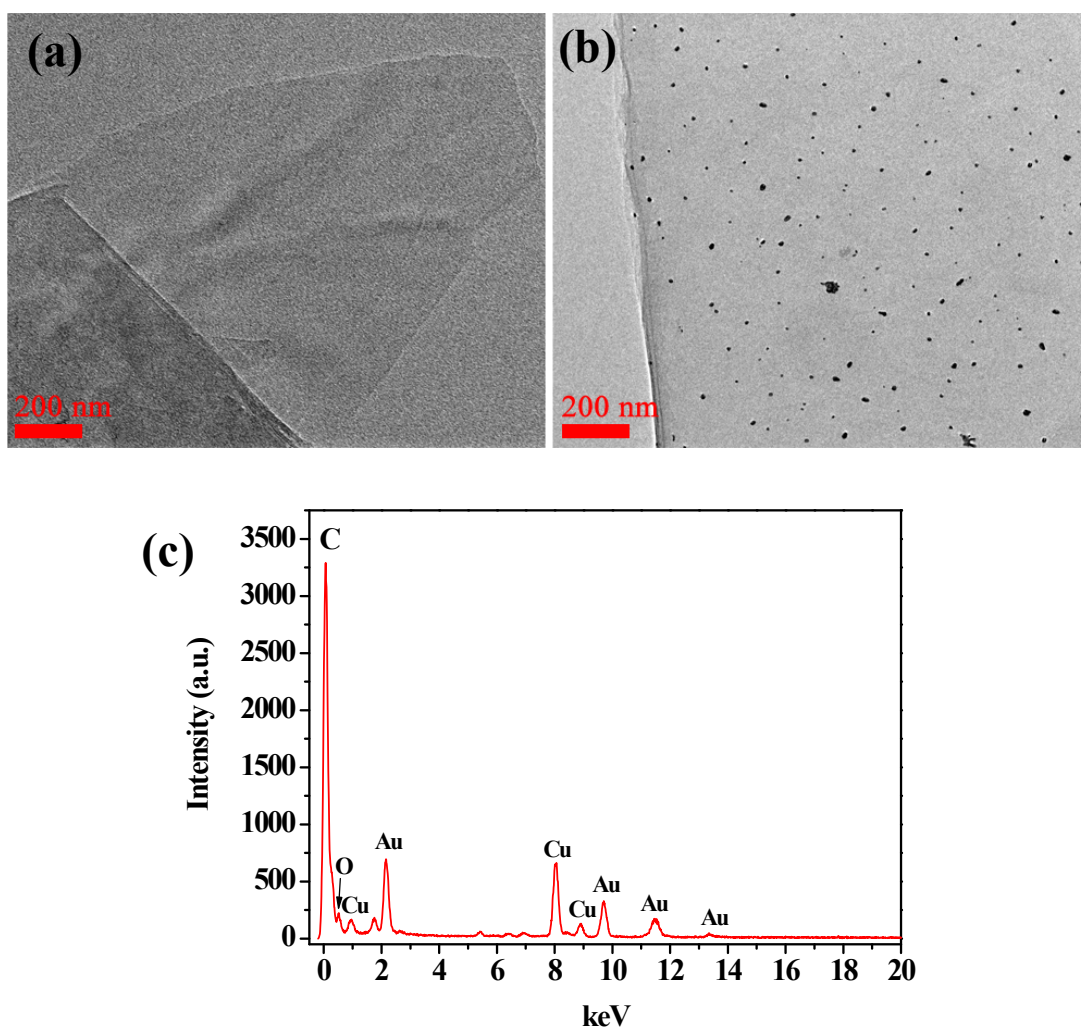


Fig. S2 TEM images of GO (a) and AuNP-GO (b), and the EDS analysis of AuNP-GO (c)

To get more detailed information of the AuNP-GO composites, we examined the composites by TEM and EDS analyses. Compared with pure GO sheet (Fig. S2 a), AuNP-GO sheet (Fig. S2 b) is uniformly decorated with many small Au nanoparticles without aggregation. The existence of Au peaks in the EDS spectrum (Fig. S2 c) further supports AuNPs coating on GO layers.

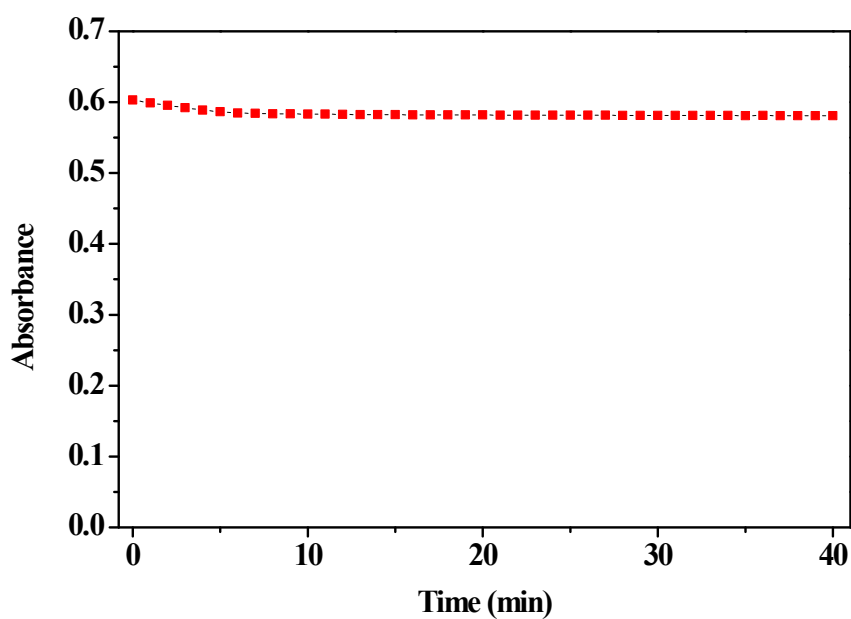


Fig. S3 UV-vis absorbance changes at 400 nm of 4-NP in the presence of rGO/QCS/Cellulose composite without AuNPs

As shown in Fig. S3, the absorbance of 4-NP at 400 nm decreases a little at the beginning several minutes, indicating the adsorption of rGO/QCS/Cellulose composite without AuNPs for 4-NP, then it declines slowly until the adsorption equilibrium is reached within 10 minutes. Based on the above result, the total adsorption rate of 4-NP is calculated at 2.7 %, it confirms that graphene has adsorption ability towards 4-NP via π - π stacking interactions.

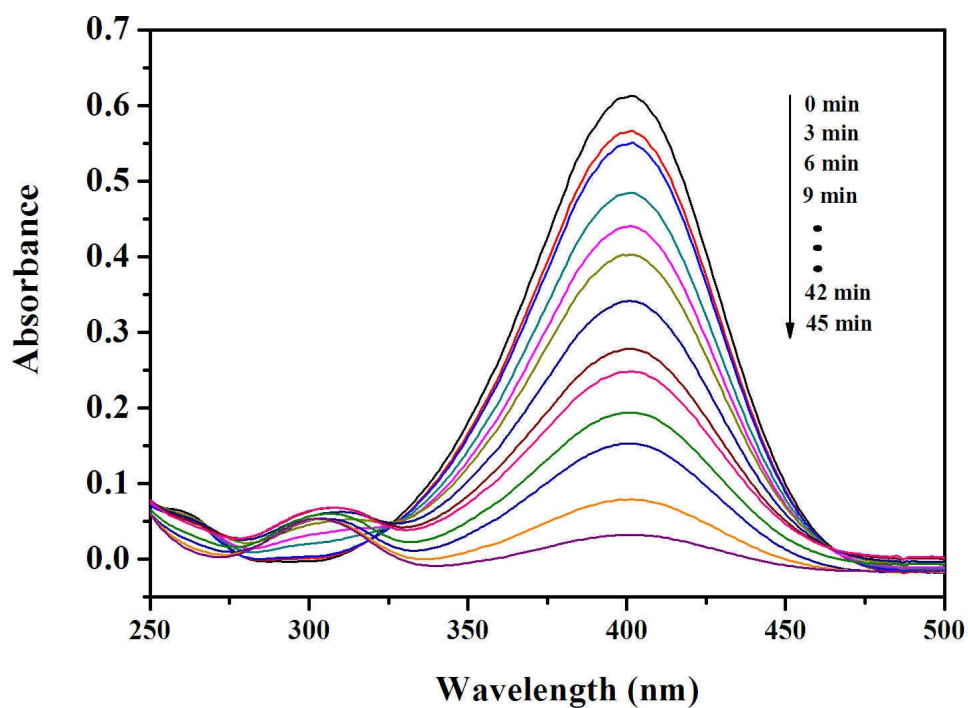


Fig. 4S UV-Vis absorption spectra of 4-NP catalyzed by AuNP /QCS/Cellulose without graphene

As shown in Fig. 4S, a long reaction time of 45 minutes was required to achieve the full reduction of 4-NP by using Au/QCS/Cellulose without graphene. While the reduction of 4-NP by the AuNP-rGO/QCS/Cellulose composite with graphene was finished for only 30 minutes. The high activity arises from the adsorption effect of graphene as confirmed in Fig.3S, it provides a high concentration of 4-NP near to the AuNPs on graphene via π - π stacking interactions, leading to a higher catalytic efficiency.