Au@TiO_2 double-shelled octahedral nanocages with improved catalytic property

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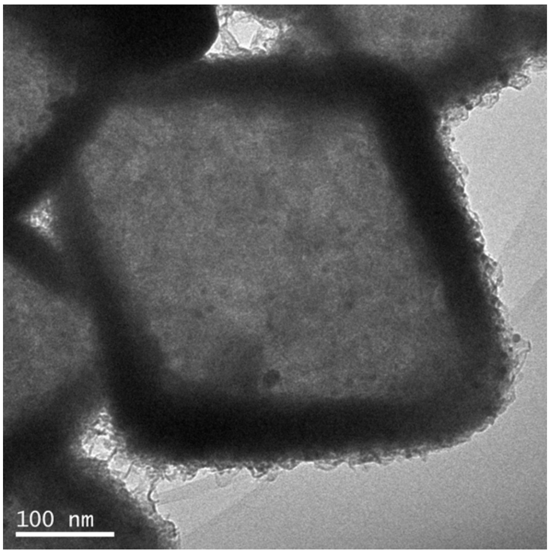

Figure S1. TEM images of the TiO_2 nanocages.

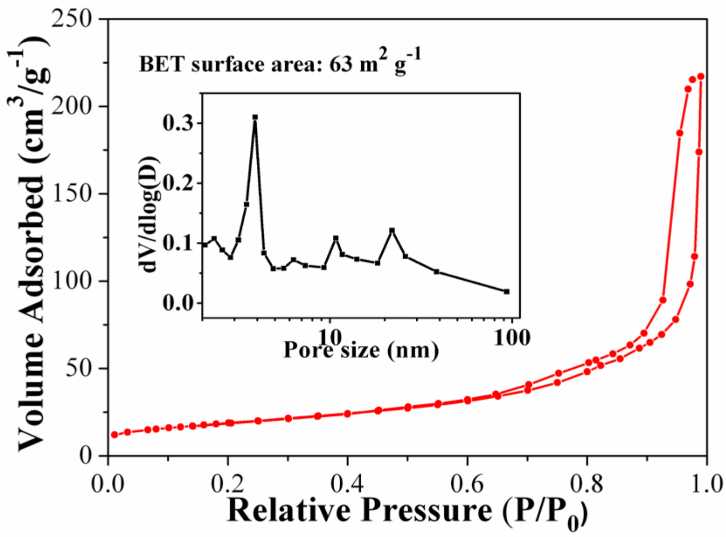

Figure S2. N_2 adsorption-desorption isotherms and the corresponding pore size distribution (inset) of the TiO_2 nanocages.

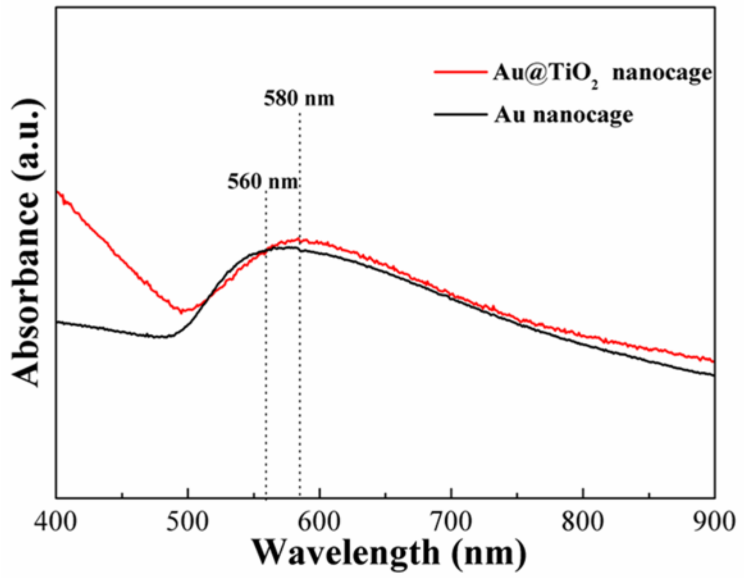

Figure S3. UV-Vis-NIR extinction spectra before (curve red) and after (curve black) being grafted to the TiO_2 shell.

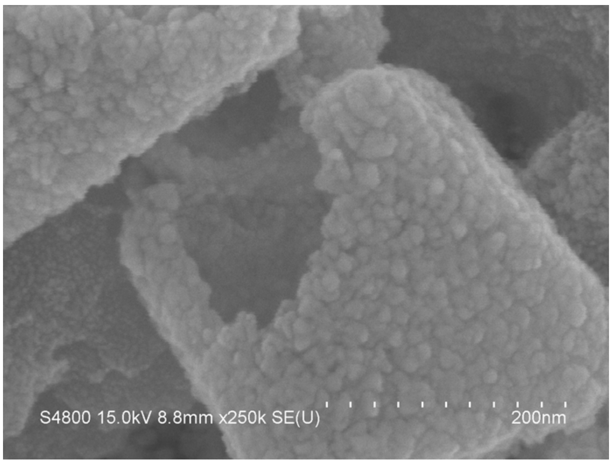

Figure S4. The FE-SEM images of the Au@TiO_2 nanocages.

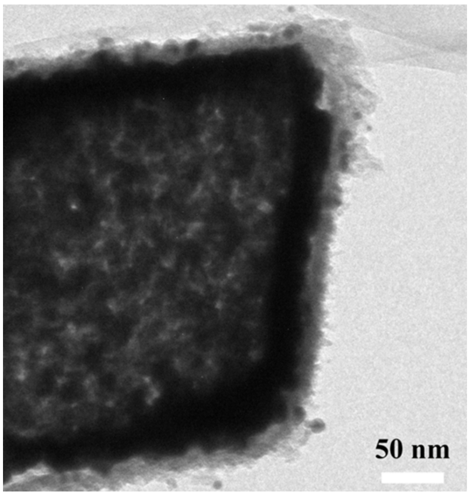

Figure S5. The TEM images of the Au@TiO_2 nanocages.

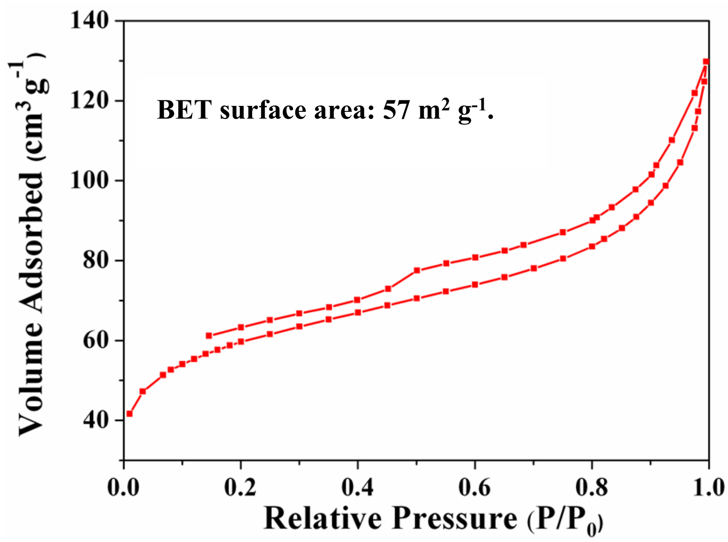

Figure S6. N_2 adsorption–desorption isotherms of the Au@TiO_2 nanocages.

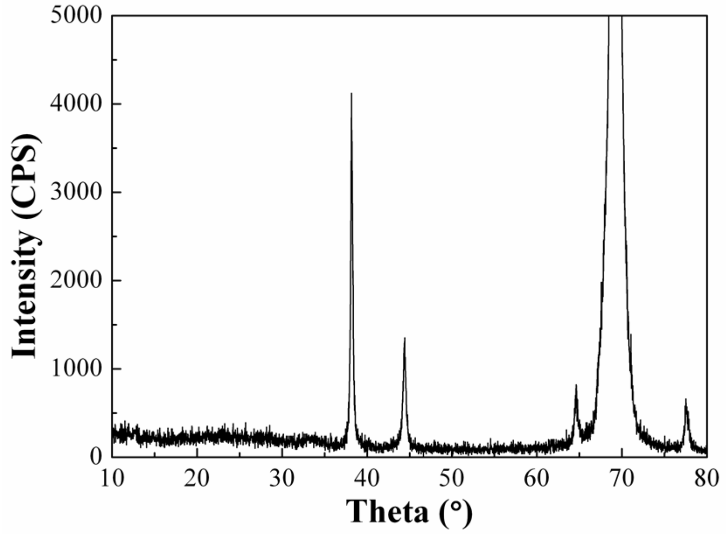

Figure S7. The XRD pattern of the $Au@TiO_2$ nanocages.

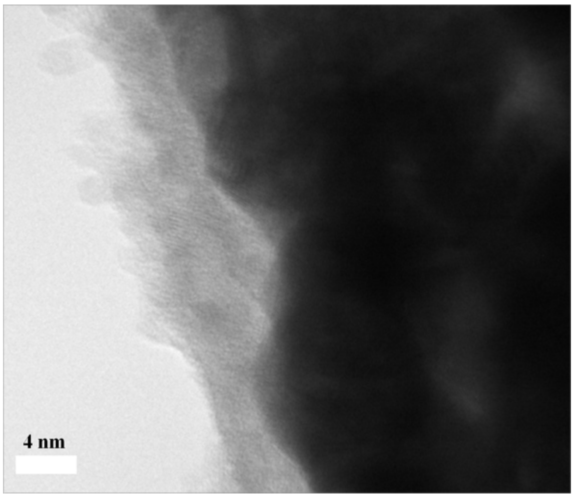

Figure S8. High resolution TEM (HRTEM) image of the $Au@TiO_2$ nanocages.

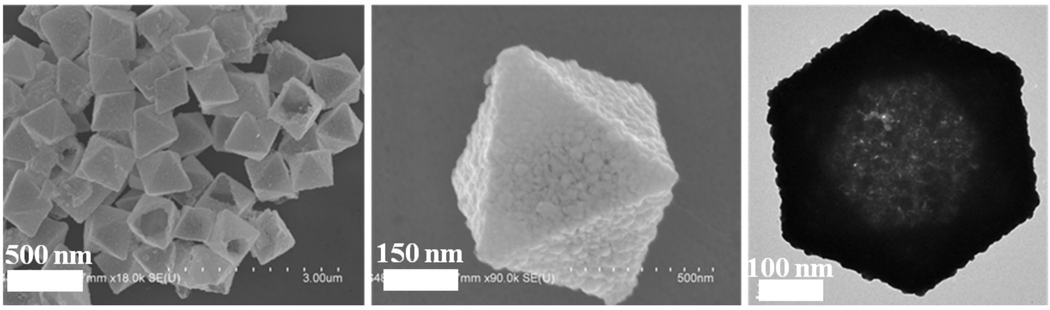

Figure S9. The typical SEM and TEM images for octahedral Au nanocages.

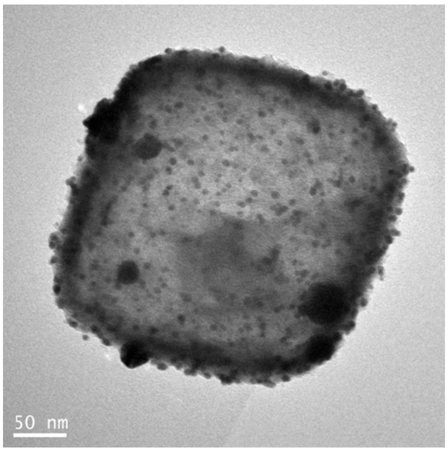

Figure S10. The typical TEM images for Au NPs@TiO_2 nanocages.

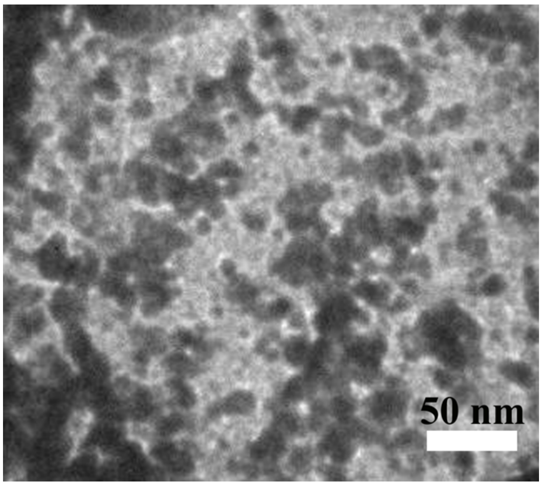

Figure S11. The typical TEM images for Au NPs.

Table S1. Au percentage composition of as-obtained samples estimated from ICP measurements and turn over frequency (TOF).

Samples	Au (wt. %) from ICP	$m_{catalyst}$ (mg)	m_{Au} (mg)	k (s^{-1})	TOF (h^{-1})
Au@TiO_2 double-shelled nanocage	40.1	0.0175	0.007	1.35×10^{-2}	870
Au nanocage	97.4	0.0072	0.007	9.50×10^{-3}	621
Au NP@TiO_2 nanocage	10.5	0.0667	0.007	8.03×10^{-3}	483
Au NP	98.1	0.0071	0.007	4.93×10^{-3}	360

Table S2. Comparision of Au@TiO_2 double-shelled nanocage during each cycle

Cycles	Reaction time (s)	Conversion efficiency (%)	k (s^{-1})
1	300	99	1.35×10^{-2}
2	290	97	1.38×10^{-2}
3	320	95	1.26×10^{-2}
4	320	96	1.26×10^{-2}
5	350	95	1.16×10^{-2}
6	360	92	1.12×10^{-2}
7	365	97	1.11×10^{-2}
8	370	95	1.09×10^{-2}
9	380	95	1.07×10^{-2}
10	380	94	1.07×10^{-2}