Supporting information

Chitosan Assisted Synthesis of 3D Graphene@Au Nanowalls Composites:

Catalytic Reduction of 4–nitrophenol

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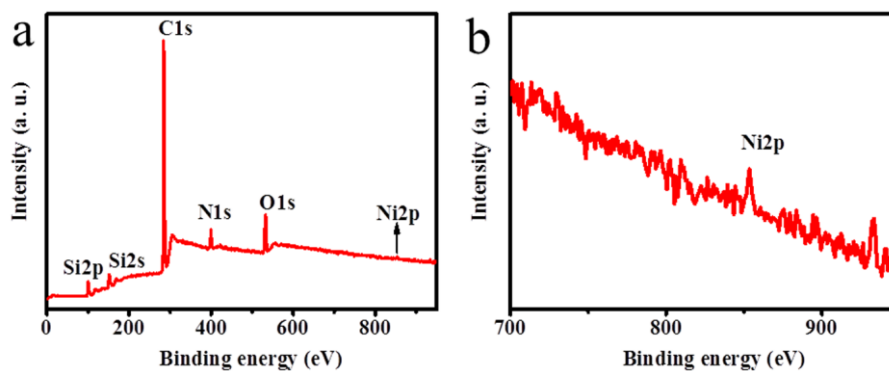
Figure S1. XPS spectrum of (a) 3DG and (b) magnification of Ni2p peak, implying negligible nickel residues (0.33 wt%) left on the surface of 3DG after thoroughly washing process. The peaks at ~100 eV (Si 2p) and ~ 150 eV (Si 2s) result from the underlying silicon substrate used to analyze samples.
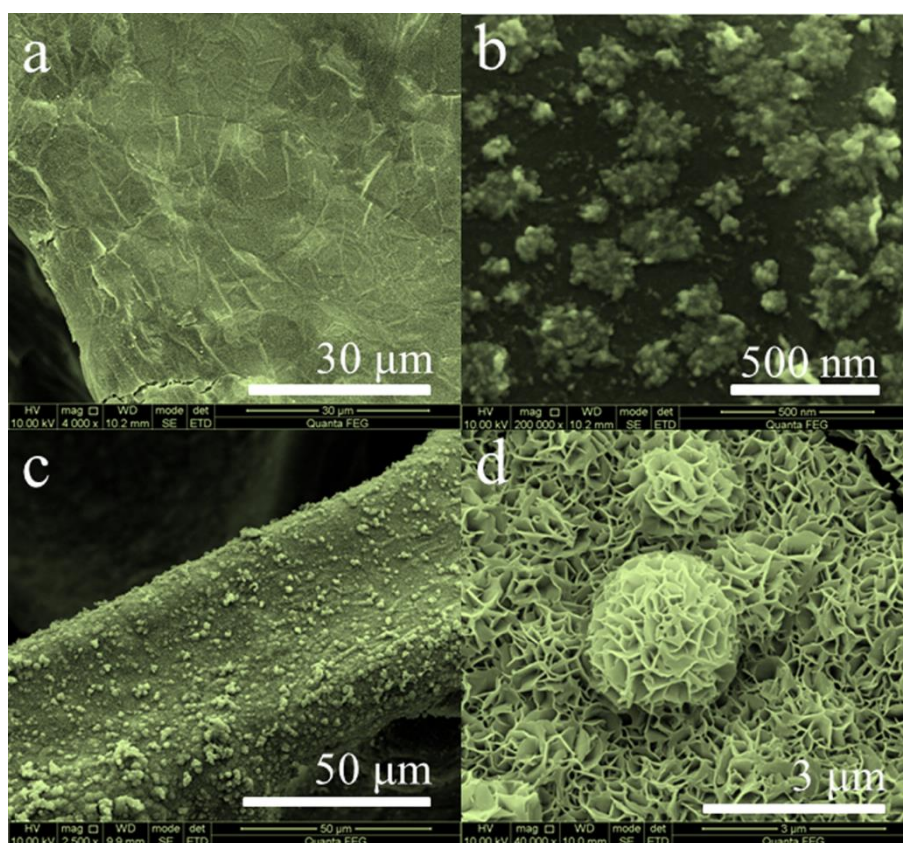

Figure S2. (a and c) Low-magnification and (b and d) high-magnification SEM images of 3DG@CS@Au synthesized in the presence of 0.05 mg/mL $HAuCl_4$ (top panel) and 1 mg/mL $HAuCl_4$ (bottom panel), respectively.
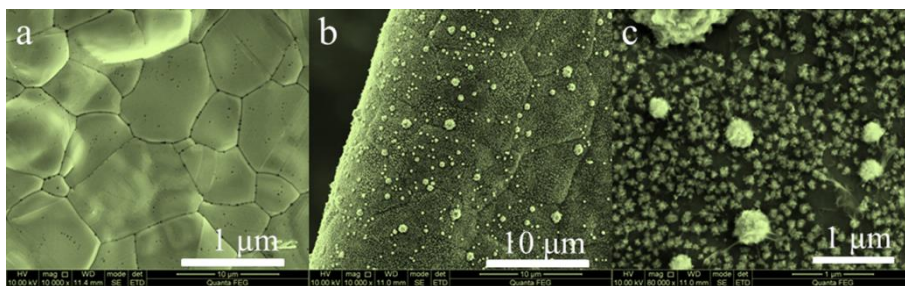
Figure S3. (a) SEM images of naked nickel foam surface. (b) Low-magnification and (c) high-magnification SEM images of Au aggregates on the surface of nickel foam.
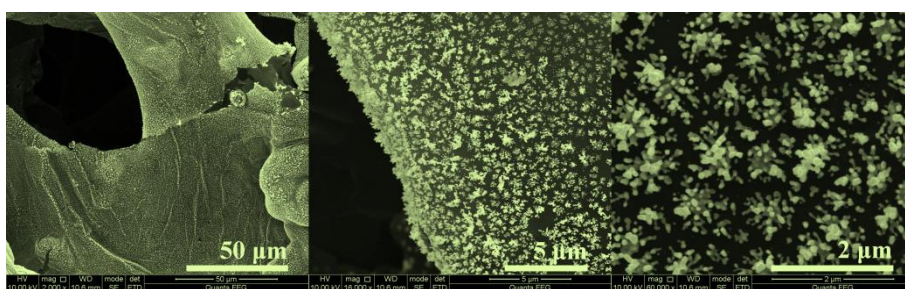

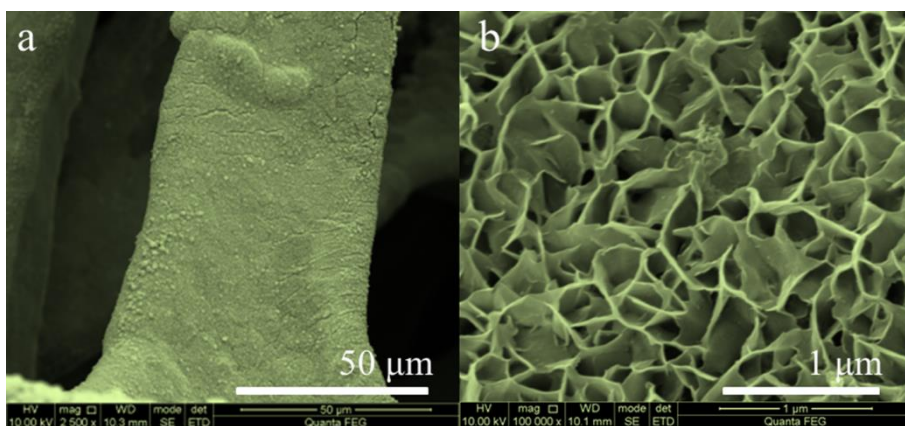**Figure S4.** SEM images of irregular gold dendrites from low to high magnification.

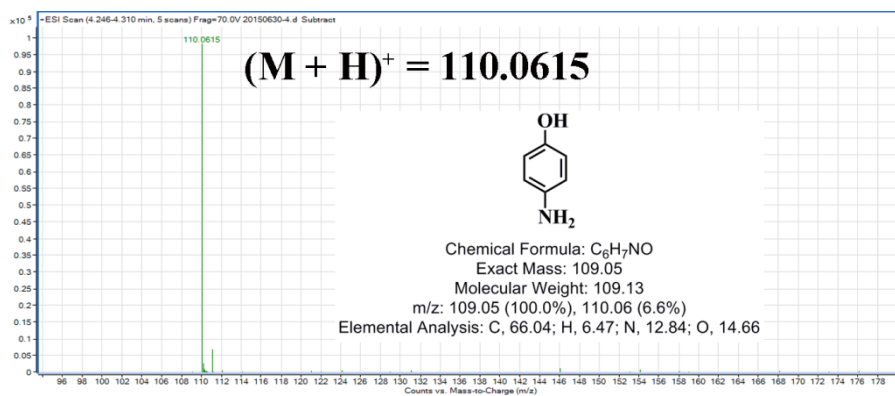**Figure S5**. SEM image of 3DG@CS@AuNWs from low to high magnification after tenth recycle.

Figure S6. Mass spectra of 4-AP measured by Agilent Technologies 6520 series Accurate Mass Quadrupole Time-of-Flight (HPLC-Q-TOF). Inset is the chemical analysis from ChemBioDraw software.

Table S1. Comparison of the catalytic performances of 3DG@CS@AuNWs, 3DG@Au, nickel foam@Au, 3DG, nickel foam, and without catalyst for the reduction of 4-NP under identical conditions. And other reported catalysts are also listed for comparison.

Entry	Catalysts	K_{app} (S^{-1})	Ref.
1	Without catalyst	4.31×10^{-5}	This work
2	Nickel foam	2.33×10^{-4}	This work
3	3DG	6.97×10^{-5}	This work
4	NF@Au	2.18×10^{-4}	This work
5	3DG@Au	6.1×10^{-3}	This work
6	3DG@CS@Au	1.23×10^{-2}	This work
7	POMs@Ag	6.65×10^{-2}	[1]
8	Au NPs/chitosan	5.61×10^{-2}	[2]
9	Au NPs/chitosan/Fe$_3$O$_4$	4.71×10^{-2}	[2]
10	AuNPs@CSNFs	5.9×10^{-3}	[3]
11	Ag-M45	5.23×10^{-3}	[4]
12	Ag@Me$_{10}$CB[5]	1.31×10^{-3}	[5]
13	Ag/MFC	1.71×10^{-2}	[6]
14	Pt–Au pNDs/RGOs	3.8×10^{-3}	[7]
15	Pt black	0.7×10^{-3}	[7]
16	Au NCs	0.3×10^{-3}	[7]
17	Au@Ag nanorods	4.57×10^{-3}	[8]
18	Pt–Au ANCs	1.33×10^{-3}	[9]
19	Cat$_3$Au$_1$	2.46×10^{-4}	[10]
20	Cu/Ag NPs	3.95×10^{-3}	[11]
21	Cu/Ag NPs	1.5×10^{-3}	[12]

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