Supplementary information

Interfacial nanodroplets guided construction of hierarchical porous Au, Au-Pt, and Au-Pd particles as excellent catalysts

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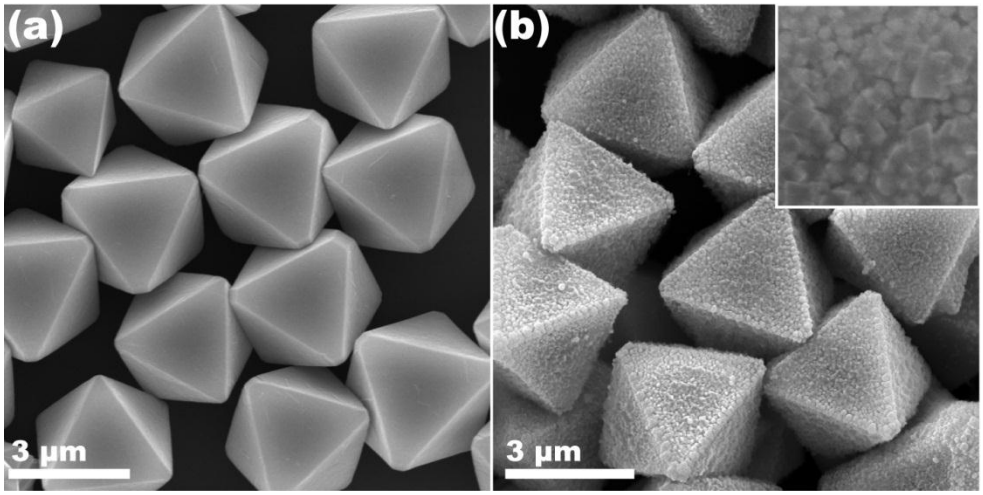

Figure S1| SEM image of (a) the hard template particles of Cu_2O octahedra, (b) Au nanoparticles coated Cu_2O octahedra after galvanic reaction between Cu_2O and $AuCl_4^-$ in water (upper inset the surface feature of Cu_2O-Au particle).

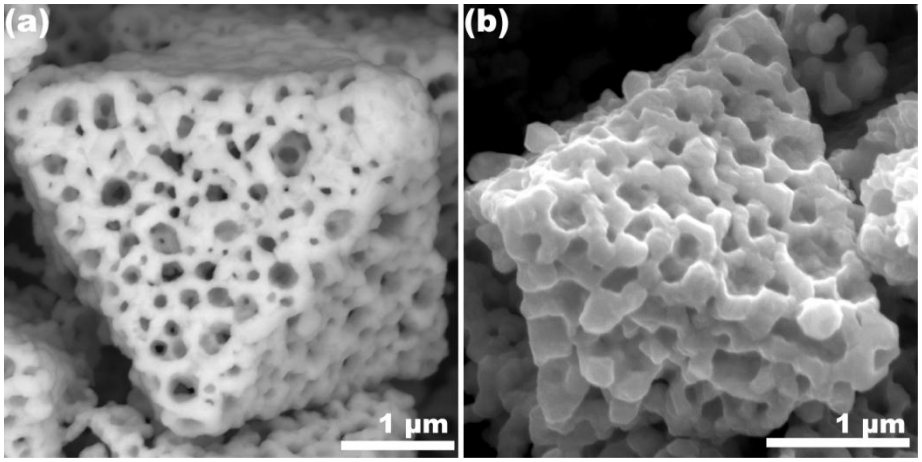

Figure S2| SEM images of the porous Au particles obtained via galvanic reaction between Cu_2O particles and $AuCl_4^-$ with the presence of emulsion droplets: (a) A close view of the 3D porous Au particles, (b) a cracked porous Au particle.

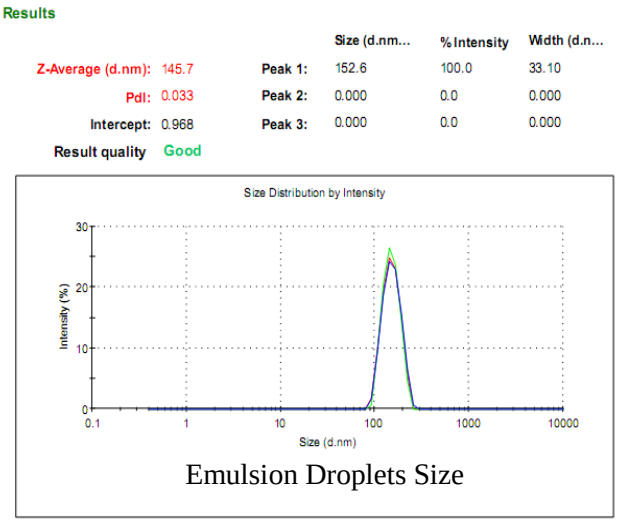

Figure S3| DLS size of the as-prepared surfactant free emulsion droplets.

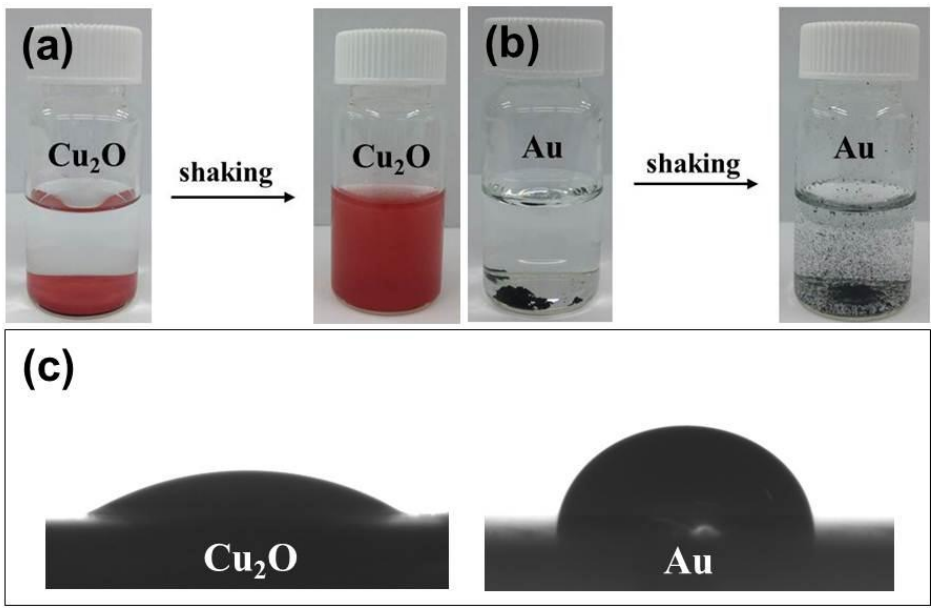

Figure S4| Photographs of the suspensions of (a) Cu_2O and (b) as-formed Au particles via galvanic reaction. Cu_2O particles could be dispersed in water by shaking while Au particles are heavily aggregated, implying Au is relatively hydrophobic while Cu_2O is relatively hydrophilic. Optical images (c) of water droplet at the surface of Cu_2O (left) and Au (right) layer in the air. The estimated contact angle of the droplets was ~31^o for Cu_2O and ~89^o for Au surface, respectively.

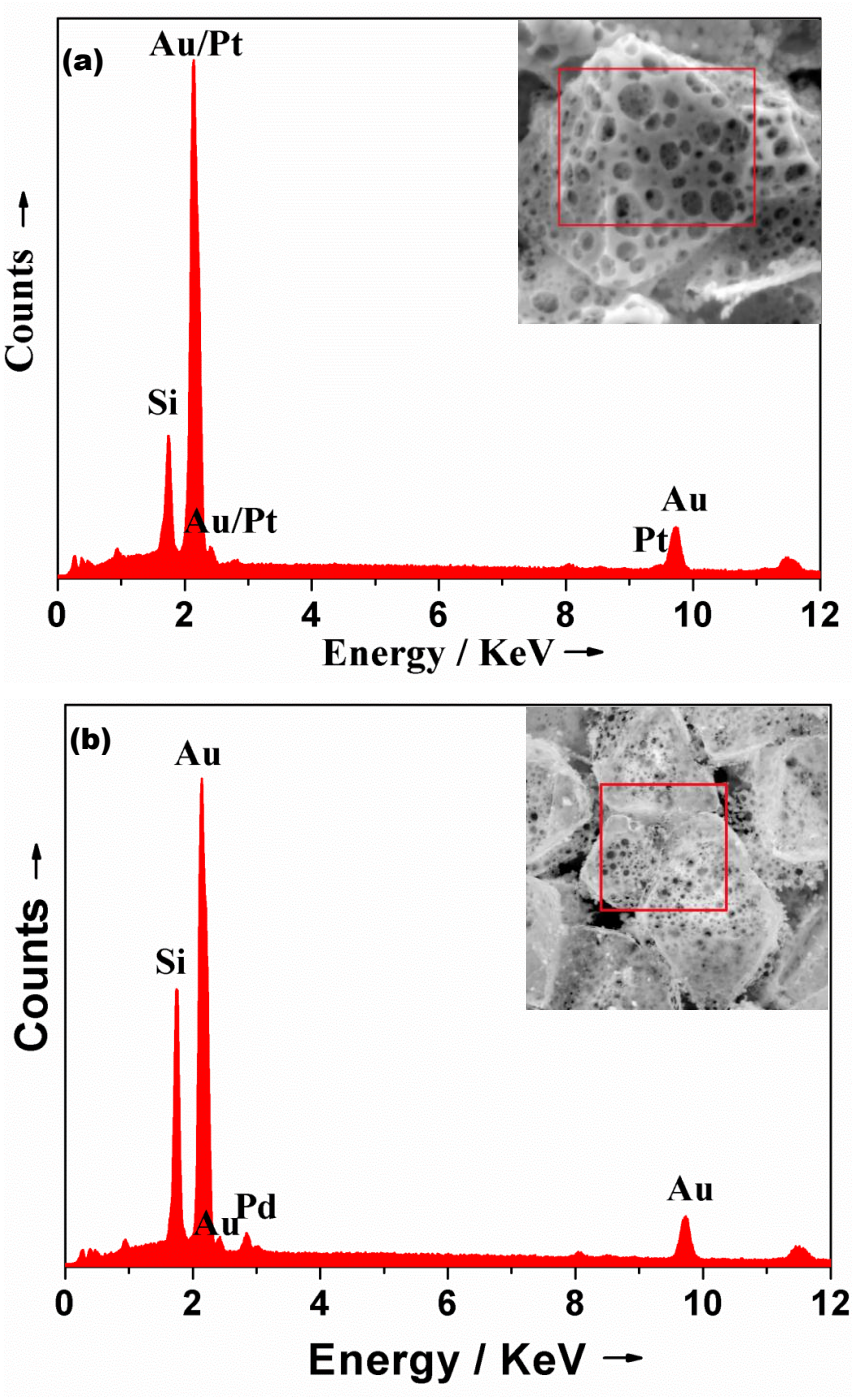

Figure S5| EDX spectra of (a) Au-Pt porous particles, the atomic ratio of Au:Pt is measured as ~10:1 (b) Au-Pd porous particles, the atomic ratio of Au:Pd is about ~13:1.

	k_a (min^{-1}) (292 K)	k_a (min^{-1}) (298 K)	k_a (min^{-1}) (302 K)
Porous Au	0.55	0.75	0.87
Porous Au-Pt	2.50	3.30	3.75
Porous Au-Pd	3.09	4.01	4.52

Table S1| Summary of the reaction rate constant (K_a) at temperature of 292, 298 and 302 K with the porous Au, Au-Pt and Au-Pd particles as catalyst.