

Electronic Supplementary Information

Fig. S1 Approach and mechanism for synthesizing SiO₂ capsulized Cu ANPs.



Fig. S2 (a) Photos of solutions collected in different reaction stages, sample 1: initial solution, sample 2: suspension containing intermediate precipitation, sample 3: suspension containing final Cu ANPs precipitation. (b) UV–vis absorbance spectrum of sample 2.

Fig. S2 a gives photos of solutions collected in different reaction stages. Sample 1 is the initial solution containing CuSO₄, PVP and NaH₂PO₂; sample 2 contains the intermediate precipitation after adding HCl; sample 3 is the final Cu ANPs precipitation. Fig. S2 b gives the UV–vis absorbance spectrum of sample 2. Two absorption bands were observed. The signed peak centered at 485 nm is attributed to Cu₂O. The other broad peak raised from 575 nm is concerned to Cu. So, Cu₂O and Cu both existed in sample 2. That is, this stage is the transformation stage from Cu₂O to Cu.





 0.5
 1
 1.5
 2
 2.5
 5
 5.5
 4
 4.5

 Full Scale 1425 cts Cursor: 4.901 (19 cts)
 keV



Fig. S3 EDX results of (a) Cu_{s1} , (b) Cu_{s2} and (c) Cu_{s3} . The samples were deposited on conductive adhesive.

According to the EDX results, the molar ratios of Cu to Si in the three samples are about 1:0.1075 (Cu_{s1}), 1:0.1748 (Cu_{s2}) and 1:0.7376 (Cu_{s3}) respectively. Comparing to the theoretical ratios of Cu and SiO₂ (1:0.1, 1:0.2 and 1:0.5), we think that most of the feeding SiO₂ was deposited onto Cu nanoparticles. The detected result of Cu_{s1} is accord with the theoretical ratio (1:0.1). Due to the randomness of selective area in EDX and unevenness of SiO₂ deposition, the detected result of Cu_{s2} is smaller than the theoretical ratio (1:0.2). While for Cu_{s3}, deposition of SiO₂ got more uneven as the feeding TEOS increased. Thus the detected result shows bigger than the theoretical ratio (1:0.5).



Fig. S4 SEM image of Cu_{s3}.



Fig. S5 TG–DTA curve for decomposition of laboratory-prepared AP.



Fig. S6 DTA curve for decomposition of AP in the presence of SiO_2 (AP:SiO₂=95:5).