Electronic Supplementary Information

Shape-Controllable and Versatile Synthesis of Copper Nanocrystals with Amino Acids as Capping Agents

Jin-Cheng Yu,[a, b] Fu-Gang Zhao,*[a, b] Wei Shao,[a, b] Cong-Wu Ge[b] and Wei-Shi Li*[a, b]

[a] *Department of Chemistry, Key Laboratory of Advanced Textile Materials and Manufacturing Technology of Education Ministry, Zhejiang Sci-Tech University, Hangzhou 310018, China.*

[b] *Key Laboratory of Synthetic and Self-assembly Chemistry for Organic Functional Molecules, Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences, 345 Lingling Road, Shanghai 200032, China.*

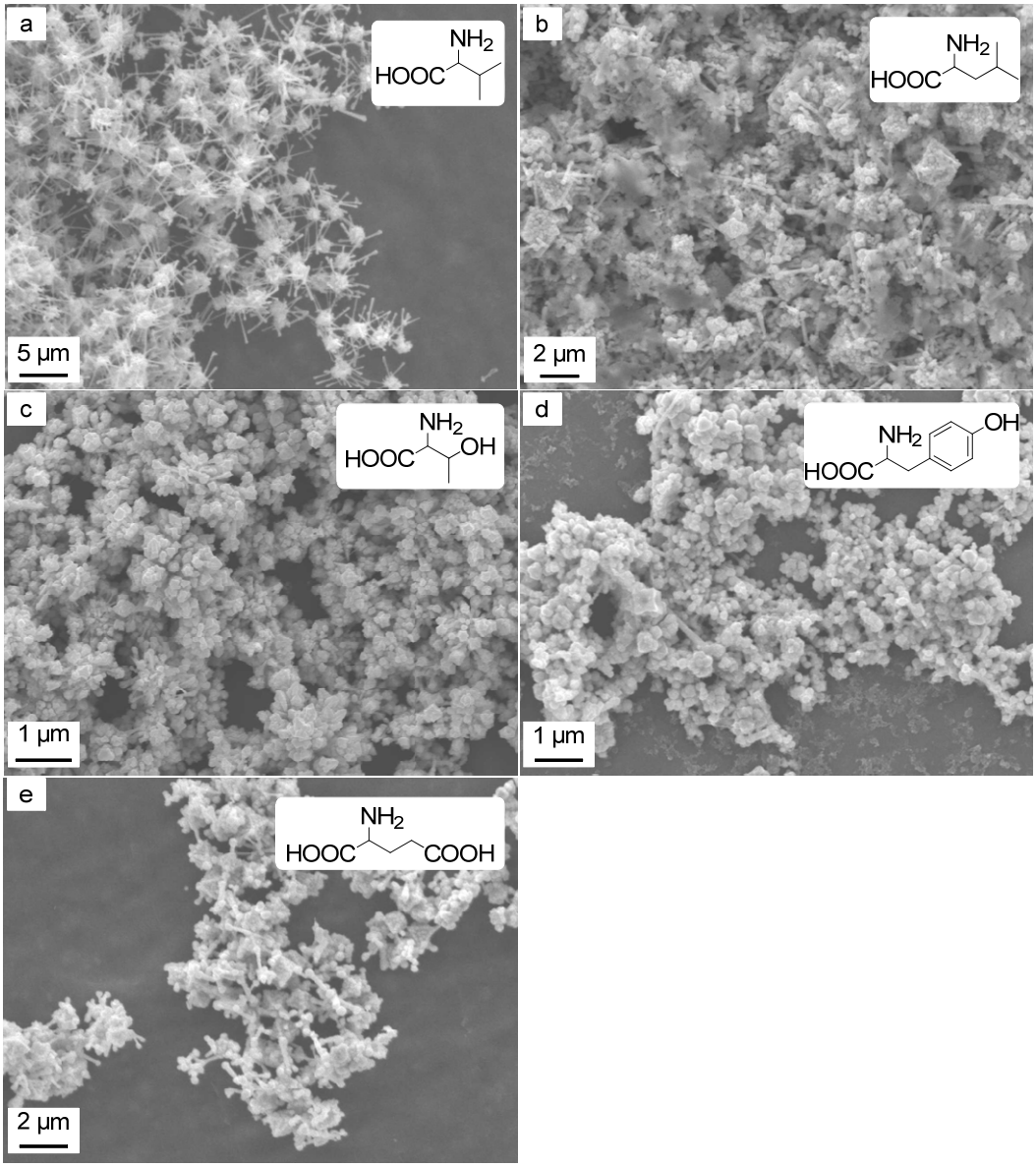

Fig. S1 SEM images of Cu nanostructures prepared under the conditions of $Cu(NO_3)_2$ (4.76 mM), NaOH (3000 eq.), amino acids (18.6 eq.) and $N_2H_4 \cdot H_2O$ (2.75 eq.) at 80 °C with the following different amino acids as the capping agent: (a) valine, (b) leucine, (c) threonine, (d) tyrosine and (e) glutamic acid.

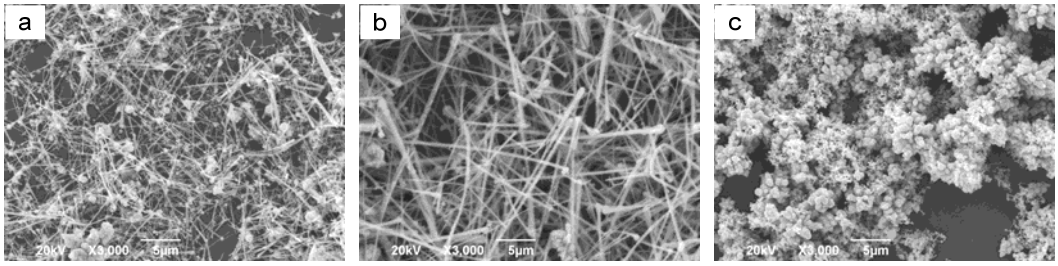

Fig. S2 SEM images of Cu nanostructures prepared under the conditions of $Cu(NO_3)_2$ (4.76 mM), NaOH (3000 eq.), and glycine (18.6 eq.) at 80 °C with the different amount of hydrazine: (a) 1.38, (b) 2.75, and (c) 4.14 eq.

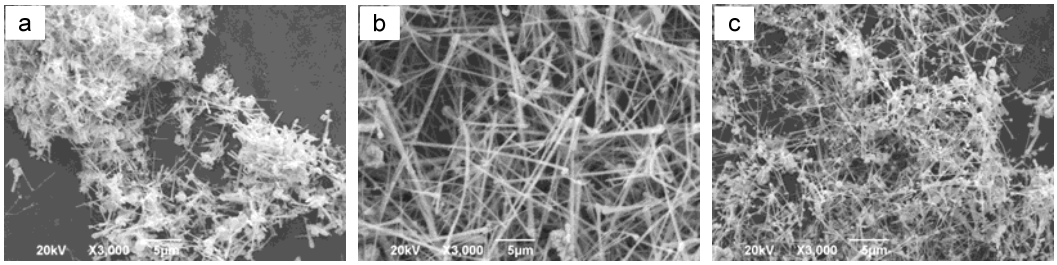

Fig. S3 SEM images of Cu nanostructures prepared under the conditions of $Cu(NO_3)_2$ (4.76 mM), glycine (18.6 eq.) and $N_2H_4 \cdot H_2O$ (2.75 eq.) at 80 °C with the different amount of NaOH: (a) 1500 (b) 3000, and (c) 4500 eq.

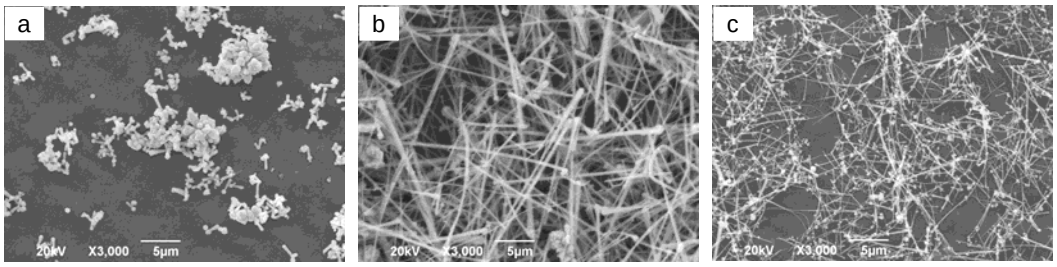

Fig. S4 SEM images of Cu nanostructures prepared under the conditions of $Cu(NO_3)_2$ (4.76 mM), NaOH (3000 eq.), and $N_2H_4 \cdot H_2O$ (2.75 eq.) at 80 °C with the different amount of glycine: (a) 9.30, (b) 18.6, and (c) 27.9 eq.

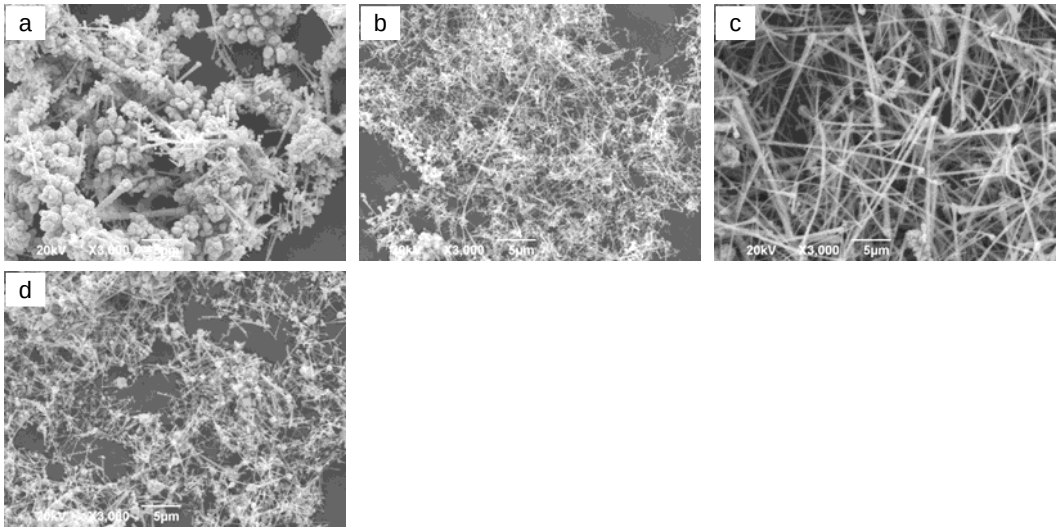

Fig. S5 SEM images of Cu nanostructures prepared under the conditions of $Cu(NO_3)_2$ (4.76 mM), NaOH (3000 eq.), glycine (18.6 eq.) and $N_2H_4 \cdot H_2O$ (2.75 eq.) at different temperature: (a) 60, (b) 70, (c) 80, and (d) 90 °C.

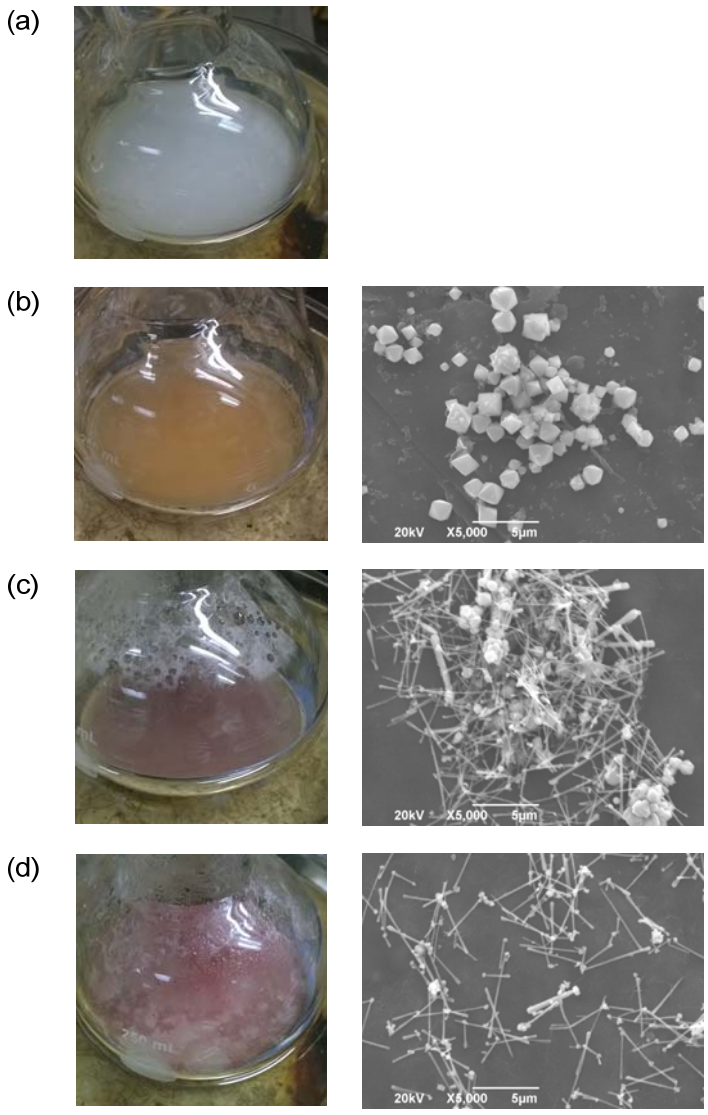

Fig. S6 Pictures of the reaction flask and the SEM images of Cu nanostructures detected around (a) 3, (b) 10, (c) 17, and (d) 22 min after the addition of hydrazine. Other conditions: $Cu(NO_3)_2$ (4.76 mM), NaOH (3000 eq.), glycine (18.6 eq.), $N_2H_4 \cdot H_2O$ (2.75 eq.) and total volume (84 mL) at 80 °C.

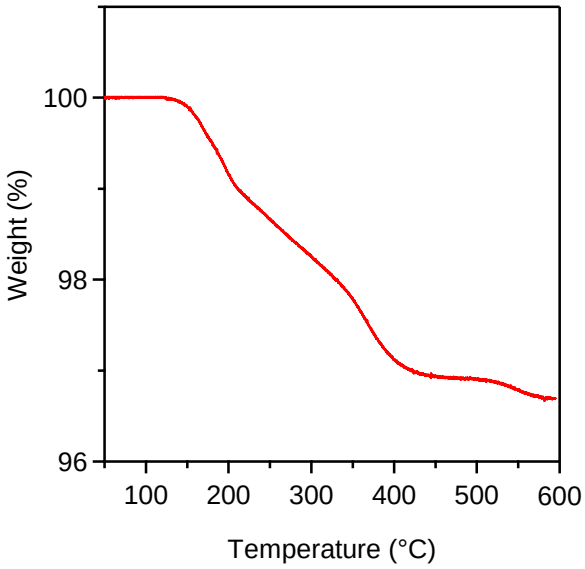

Fig. S7 TGA profile of Gly@CuNW under a N_2 flowing atmosphere at a heating rate of 10 °C min^{-1}.

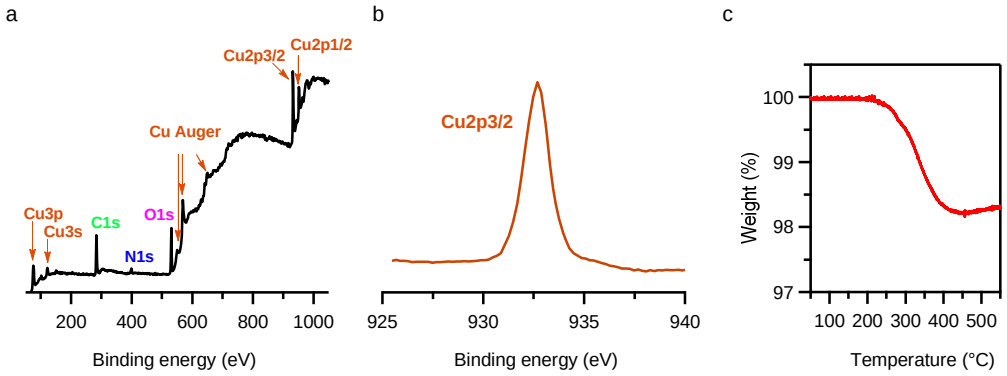

Fig. S8 (a) Survey XPS spectrum and (b) its magnification at Cu 2p3/2 peak, and (c) TGA curve of His@CuNP.