



Supplementary Material

Growth of Porous Ag@AuCu Trimetal Nanoplates Assisted by Self-Assembly

Wan-Cheng Zhang^{1,†}, Meng-Dai Luoshan^{1,2,†}, Peng-Fei Wang², Chu-Yun Huang¹,

Qu-Quan Wang², Si-Jing Ding^{3,*} and Li Zhou^{2,*}

¹ School of Science, Hubei University of Technology, Wuhan 430068, China;

wanchengzhang.nano@gmail.com (W.-C.Z.); Luosmd@hbut.edu.cn (M.-D.L.); chuyunh@163.com (C.-Y.H.)

² Key Laboratory of Artificial Micro- and Nano-structures of the Ministry of Education, School of Physics and Technology, Wuhan University, Wuhan 430072, China; pfwang__opt@126.com (P.-F.W.); qqwang@whu.edu.cn (Q.-Q.W.)

³ School of Mathematics and Physics, China University of Geosciences, Wuhan 430074, China.

* Correspondence: dingsijing@cug.edu.cn (S.-J.D.); zhouli@whu.edu.cn (L.Z.)

† These authors equally contributed to this work.



Figure S1. High resolution TEM image of AuCu alloy nanocrystals with an Au:Cu atomic ratio of 1.78.

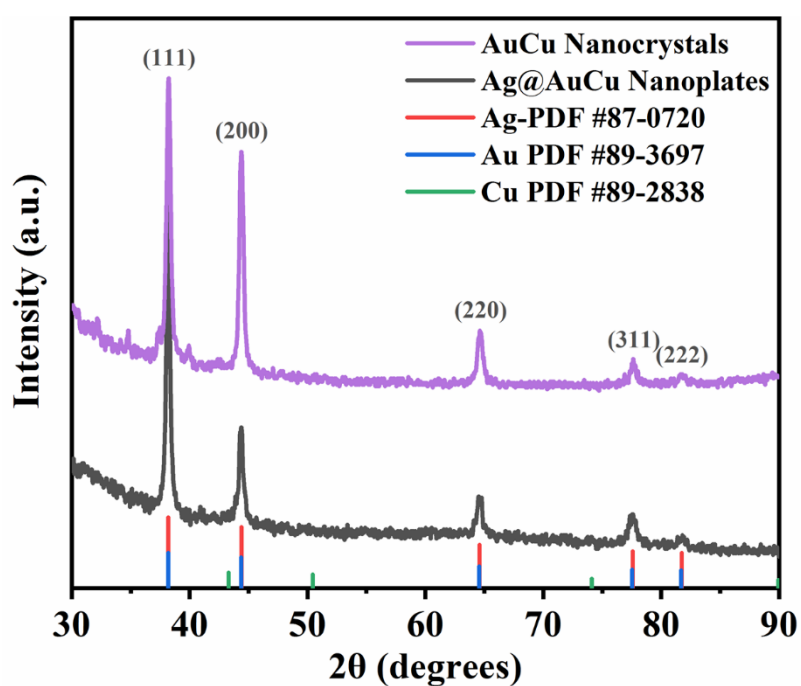


Figure S2. XRD patterns of AuCu nanocrystals and Ag@AuCu nanoplates. The XRD pattern of AuCu nanocrystals is similar with the pentacle AuCu nanocrystals reported in Ref [17]. As the lattice constant of Au and Ag is similar, the Au phase and Ag phase is unresolved in XRD pattern. The XRD pattern is almost unchanged after the self-assembly and Ag deposition.

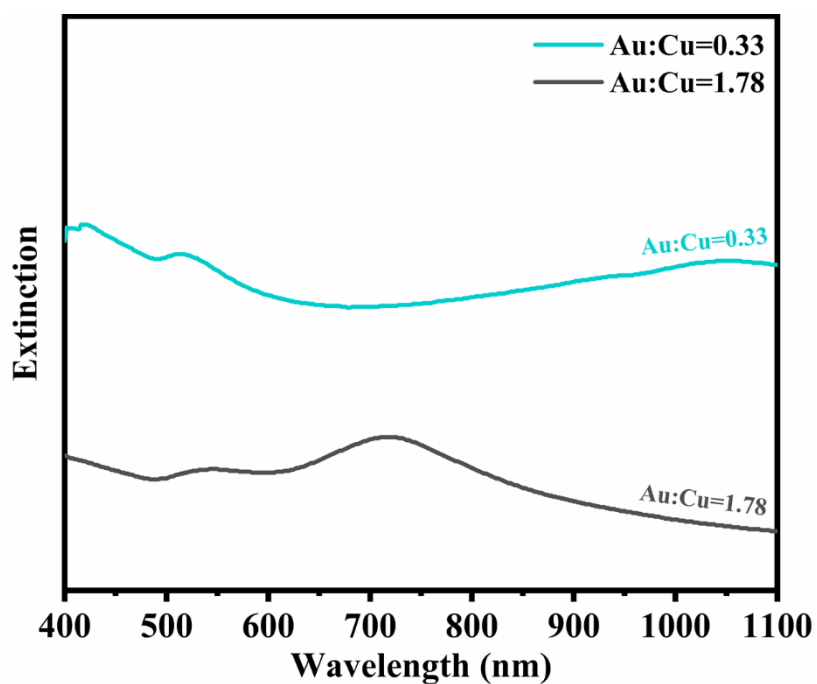


Figure S3. Extinction spectra of AuCu alloy nanostructures with different Au:Cu atom ratios in aqueous solution.

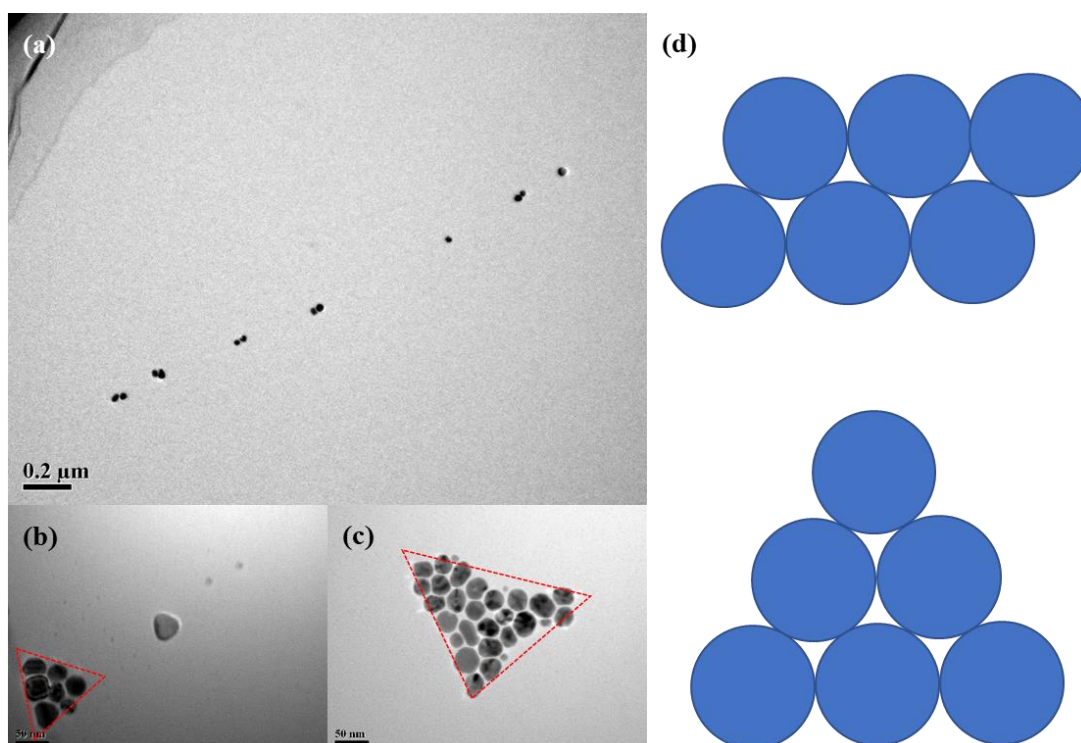


Figure S4. The initial self-assembly of Ag nanoparticles forming a triangular structure: (a–c) TEM images of Ag nanoparticles; (d) The self-assembly model of Ag nanoparticles, the triangular structure obtains higher stability.

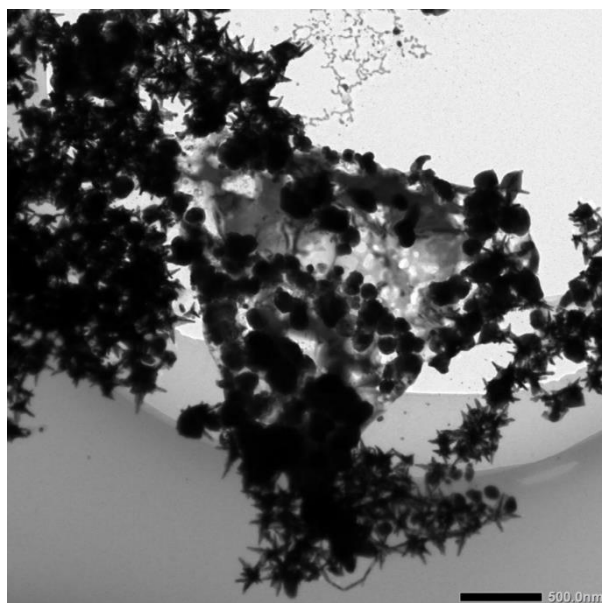


Figure S5. TEM image of the transitional form of Ag@AuCu trigonal nanoplates between Figure 3(a) and Figure 3(b) with a low concentration of AgNO₃ (50 μ L).

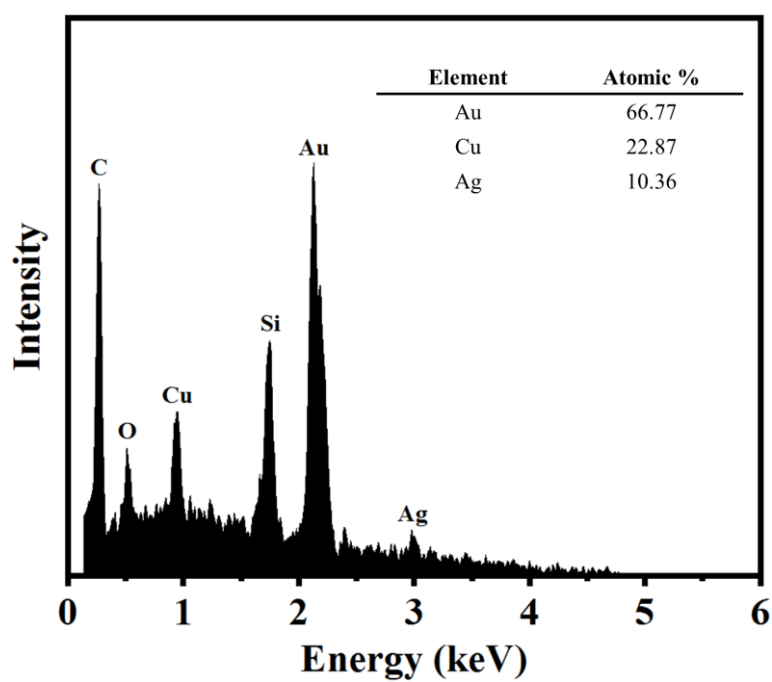


Figure S6. EDS spectrum of the Ag@AuCu trigonal nanoplates. The compositions of Au, Cu, and Ag are all observed.

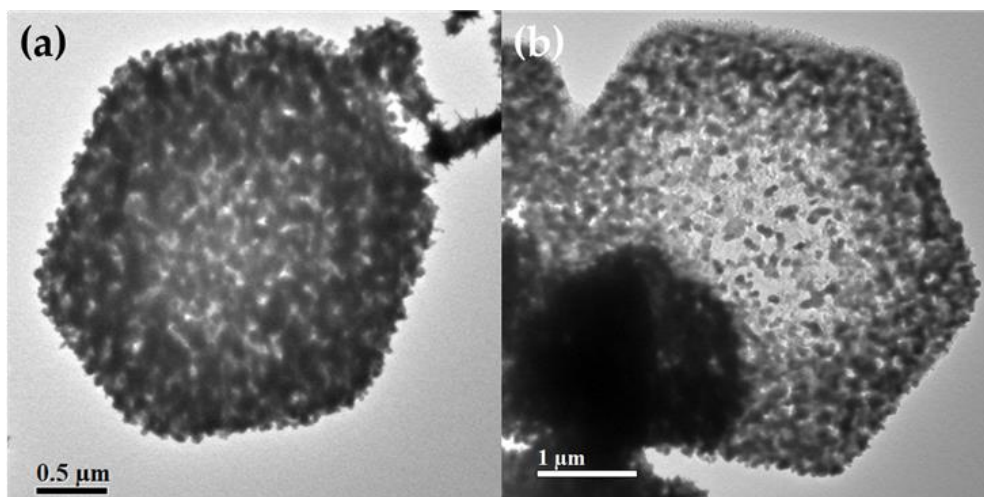


Figure S7. TEM images of Ag@AuCu hexagonal nanoplates with a relatively empty interior. Their average side lengths are (a) $2.36 \pm 0.1 \mu\text{m}$ and (b) $1.48 \pm 0.1 \mu\text{m}$.

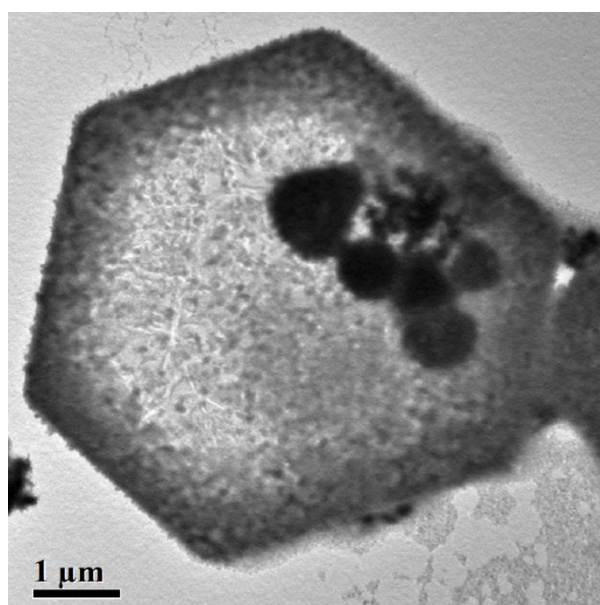


Figure S8. TEM image of Complex nanostructures of Ag@AuCu hexagonal nanoplate with a high concentration of AgNO_3 (2000 μL). Several tiny trigonal nanoplates and hexagonal nanoplates can be observed above a huge hexagonal nanoplate.

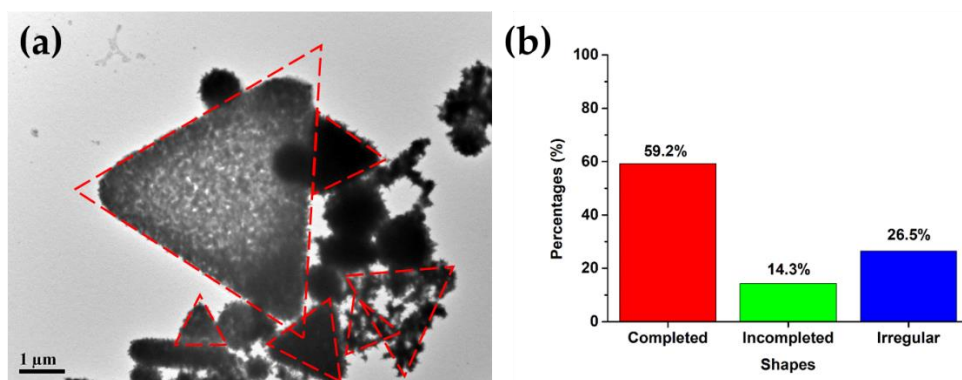


Figure S9. TEM image and statistical data of Ag@AuCu trigonal nanoplates. The dashed triangles in (a) mark the Ag@AuCu nanoplates with completed trigonal shape. The histogram in (b) show the percentages of three kinds of Ag@AuCu nanostructures: Completed - nanoplates with a clear trigonal boundary (both porous and solid nanoplates); Incompleted - incomplete shapes, like wires and trapezoids; Irregular - nanostructures with irregular shapes.

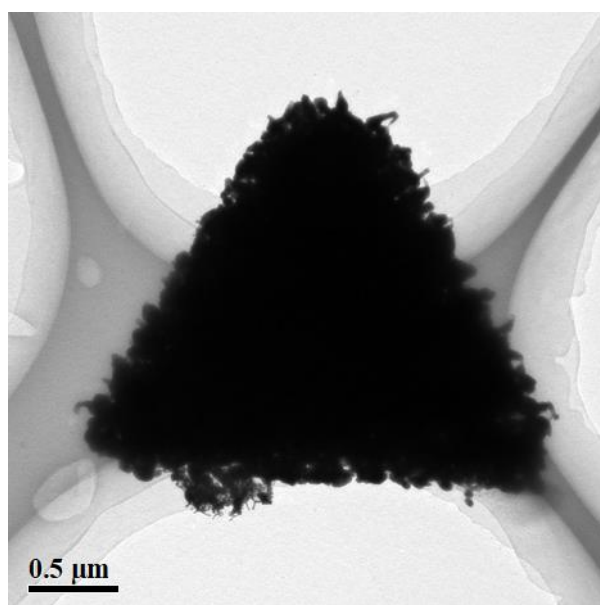


Figure S10. Growth of solid trigonal nanoplate of the Ag@AuCu nanostructures based on the AuCu alloy nanocrystals with an Au:Cu ratio of 0.33 using another method.

References

17. He, R.; Wang, Y.C.; Wang, X.; Wang, Z.; Liu, G.; Zhou, W.; Wen, L.; Li, Q.; Wang, X.; Chen, X.; Zeng, J.; Hou, J.G. Facile synthesis of pentacle gold–copper alloy nanocrystals and their plasmonic and catalytic properties. *Nat. Commun.* **2014**, *5*, 4327. [[CrossRef](#)]