Supplementary Information

Ultrafast formation of hollow Cu@Ag core-shell nanocrystals and their surface-enhanced Raman scattering properties

Junbing Wang[a†], Hao Wang[a†], Bin Liu[a], Shinya Maenosono[b] and Jianhui Yang[a*]*

[a]*Key Laboratory of Synthetic and Natural Functional Molecule Chemistry of Ministry of Education, Shaanxi Key Laboratory of Physico-Inorganic Chemistry, College of Chemistry & Materials Science, Northwest University, Xi'an 710069, P. R. China.*

[b]*School of Materials Science, Japan Advanced Institute of Science and Technology, 1-1 Asahidai, Nomi, Ishikawa 923-1292, Japan.*

[†]*The authors contributed equally to this work.*

**Corresponding authors. E-mail address: shinya@jaist.ac.jp (S. Maenososno), jianhui@nwu.edu.cn (J. Yang).*

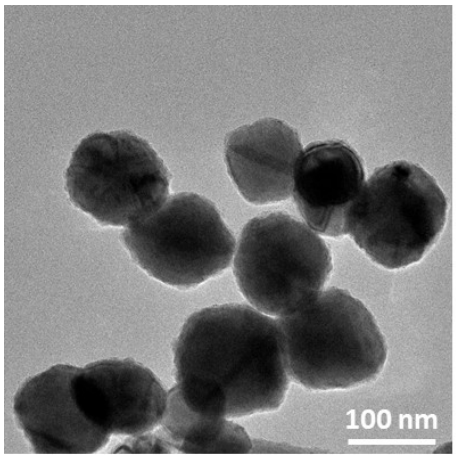

Fig. S1 TEM image of Cu NCs obtained before adding $AgNO_3$ solution in the typical synthesis.

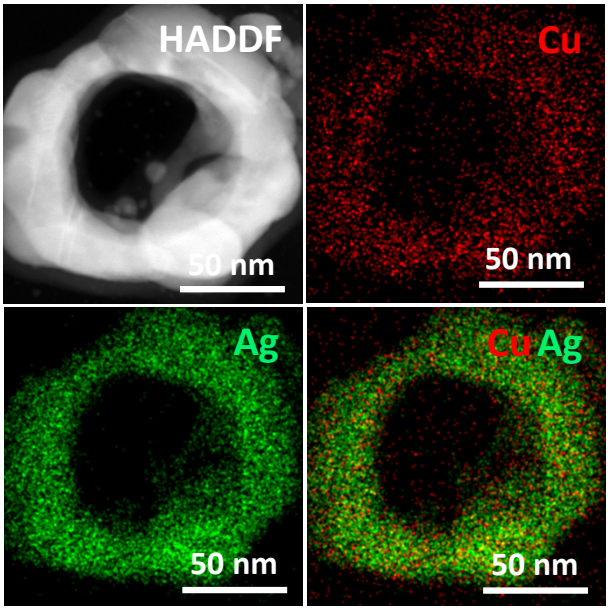

Fig. S2 HAADF-STEM image and EDS elemental maps of Cu-Ag nanoshells prepared by decreasing the molar ratio of Ag and Cu to 1:8.

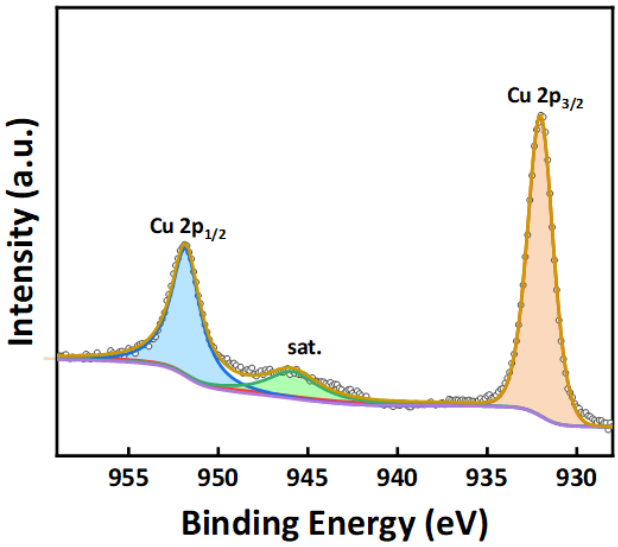

Fig. S3 XPS spectrum of Cu 2p in Cu NCs.

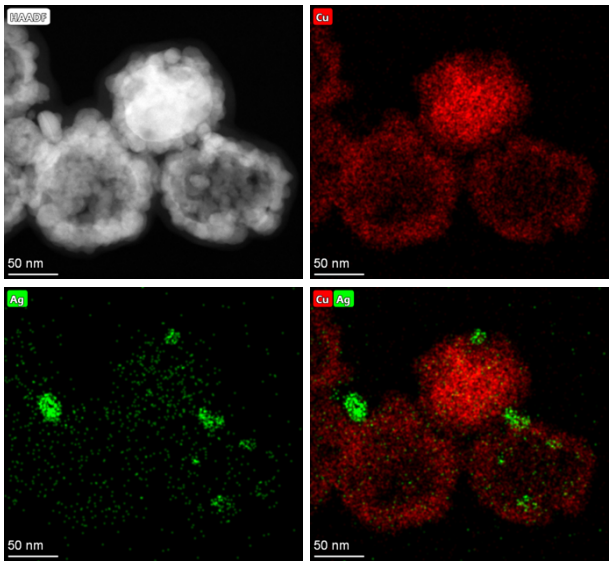

Fig. S4 HAADF-STEM image and EDS elemental maps of Cu-Ag bimetallic NCs synthesized at a solution pH of 11.

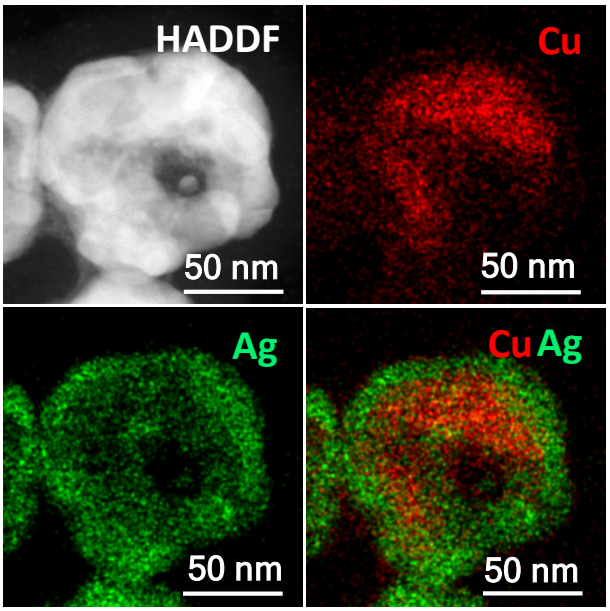

Fig. S5 HAADF-STEM image and EDS elemental maps of hollow Cu@Ag core-shell NCs prepared by extending the reaction time to 50 min after adding $AgNO_3$ solution in the typical synthesis.

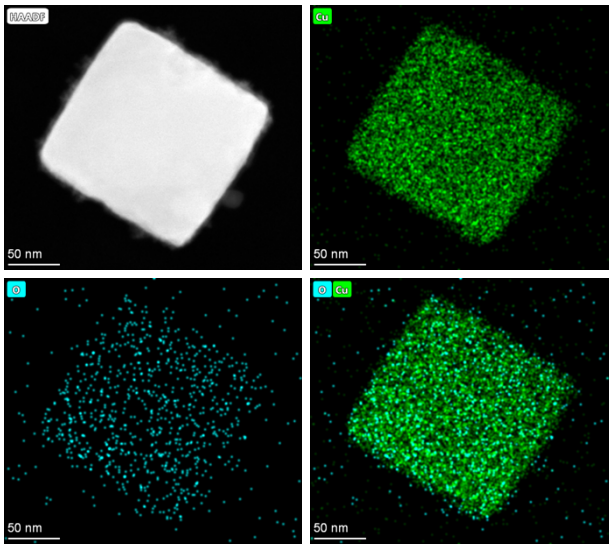

Fig. S6 HAADF-STEM image and EDS elemental maps of Cu NCs after being exposed in air for a week.

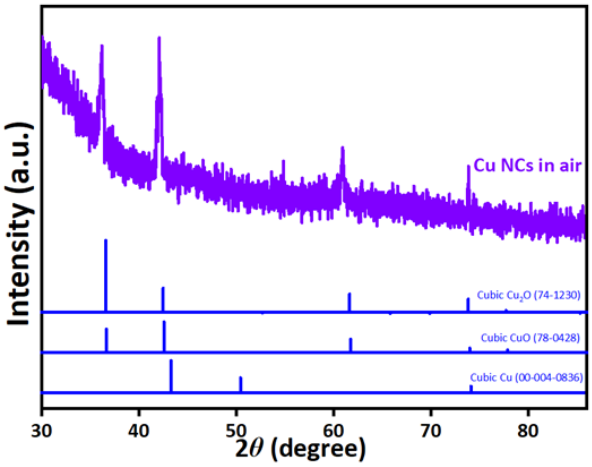

Fig. S7 XRD pattern of Cu NCs after being exposed in air for a week.

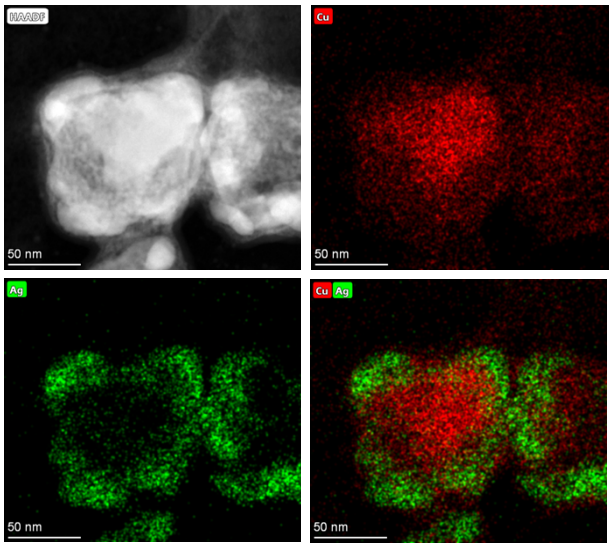

Fig. S8 HAADF-STEM image and EDS elemental maps of hollow Cu@Ag core-shell NCs after being exposed in air for a week.

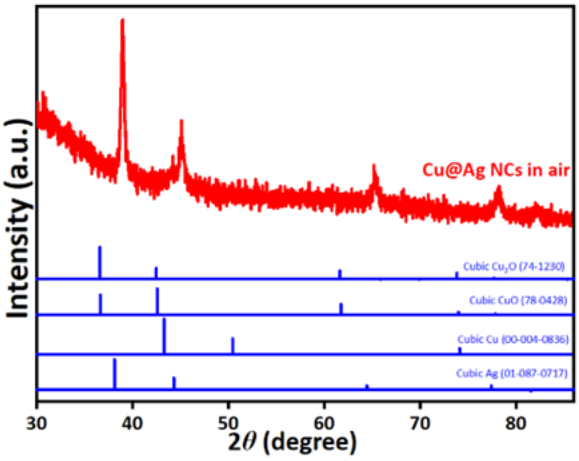

Fig. S9 XRD pattern of hollow Cu@Ag core-shell NCs after being exposed in air for a week.