

## Supplementary Information

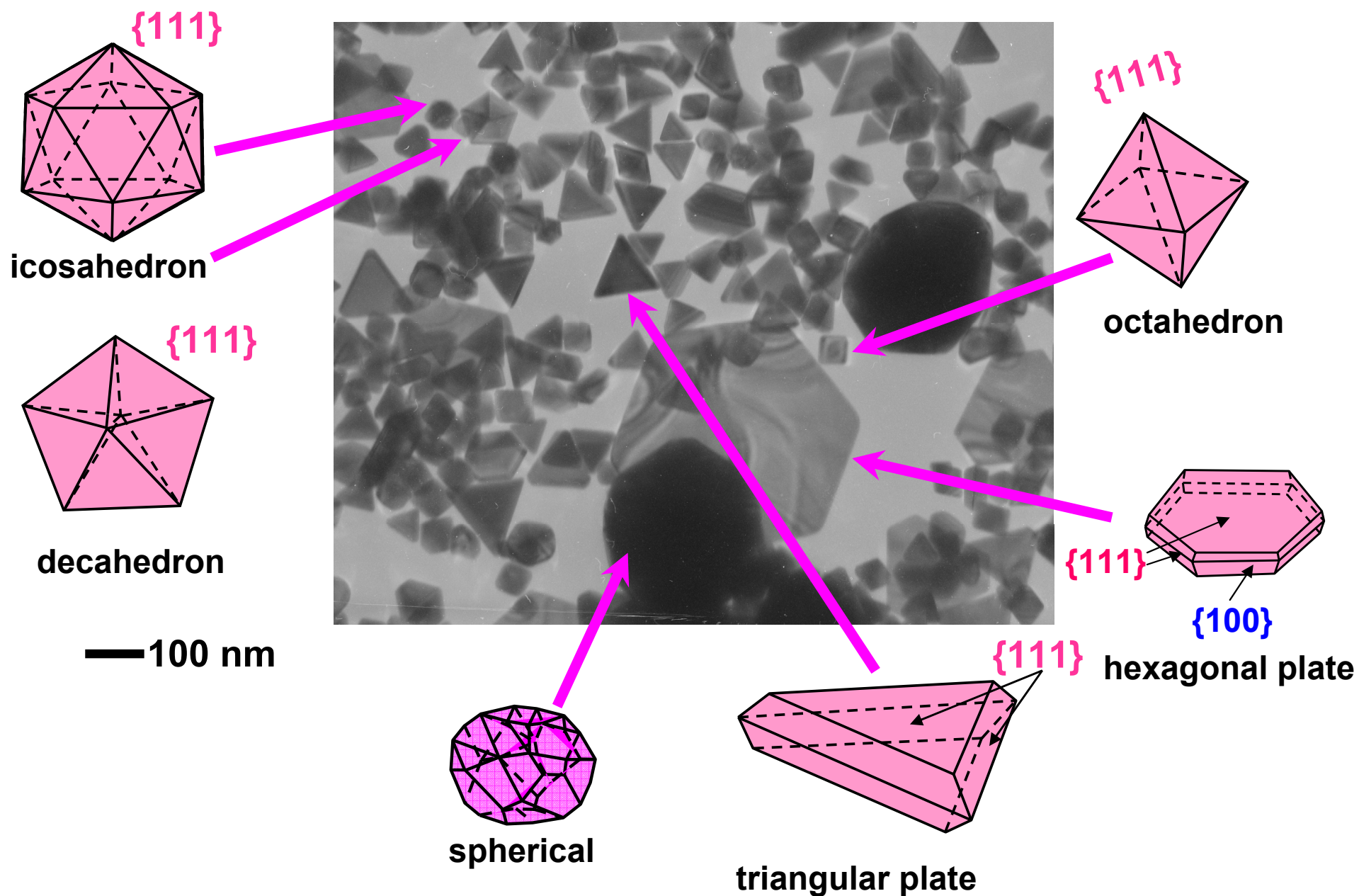
### Effects of gas bubbling for shape, size, and composition changes in Au–Ag bimetallic nanoparticles including polygonal Au seeds under oil-bath heating at 150° C

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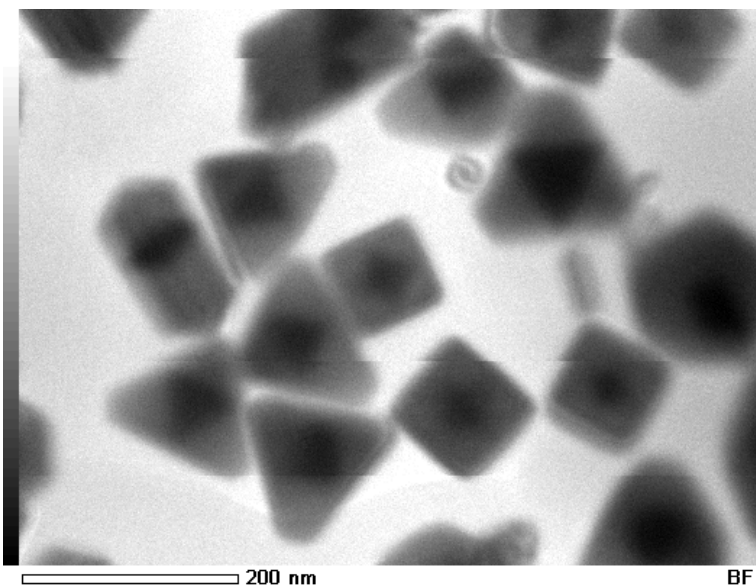
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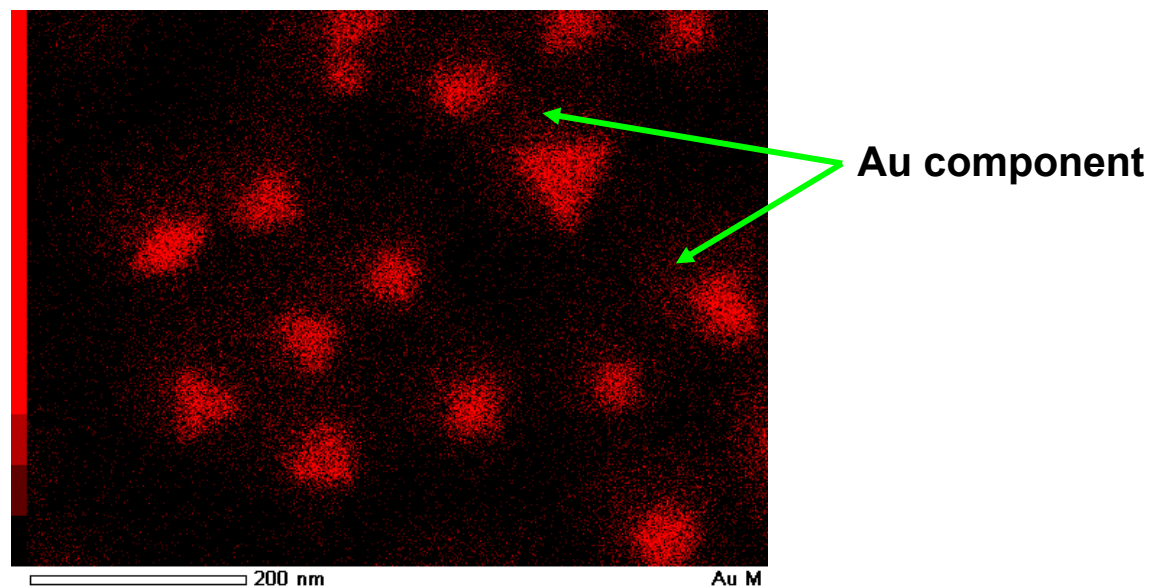


**Fig. S1.** TEM image of typical polygonal Au seeds and their crystal structures.

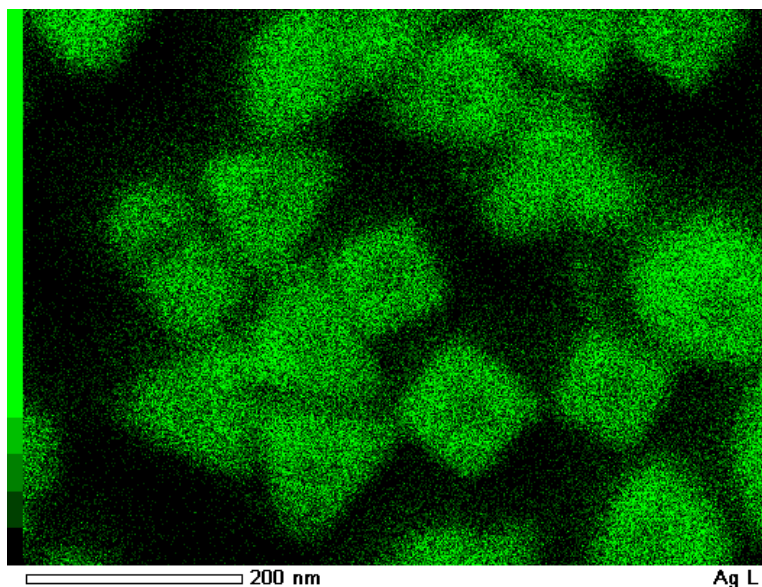
(a) TEM



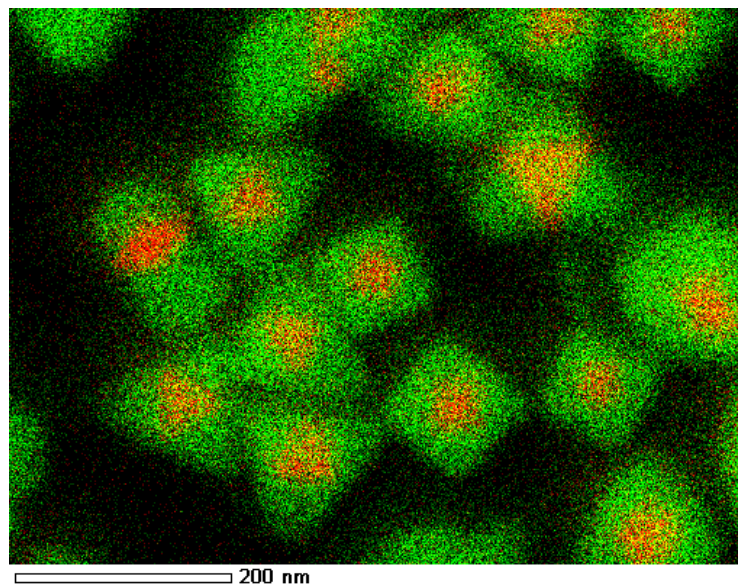
(b) Au component



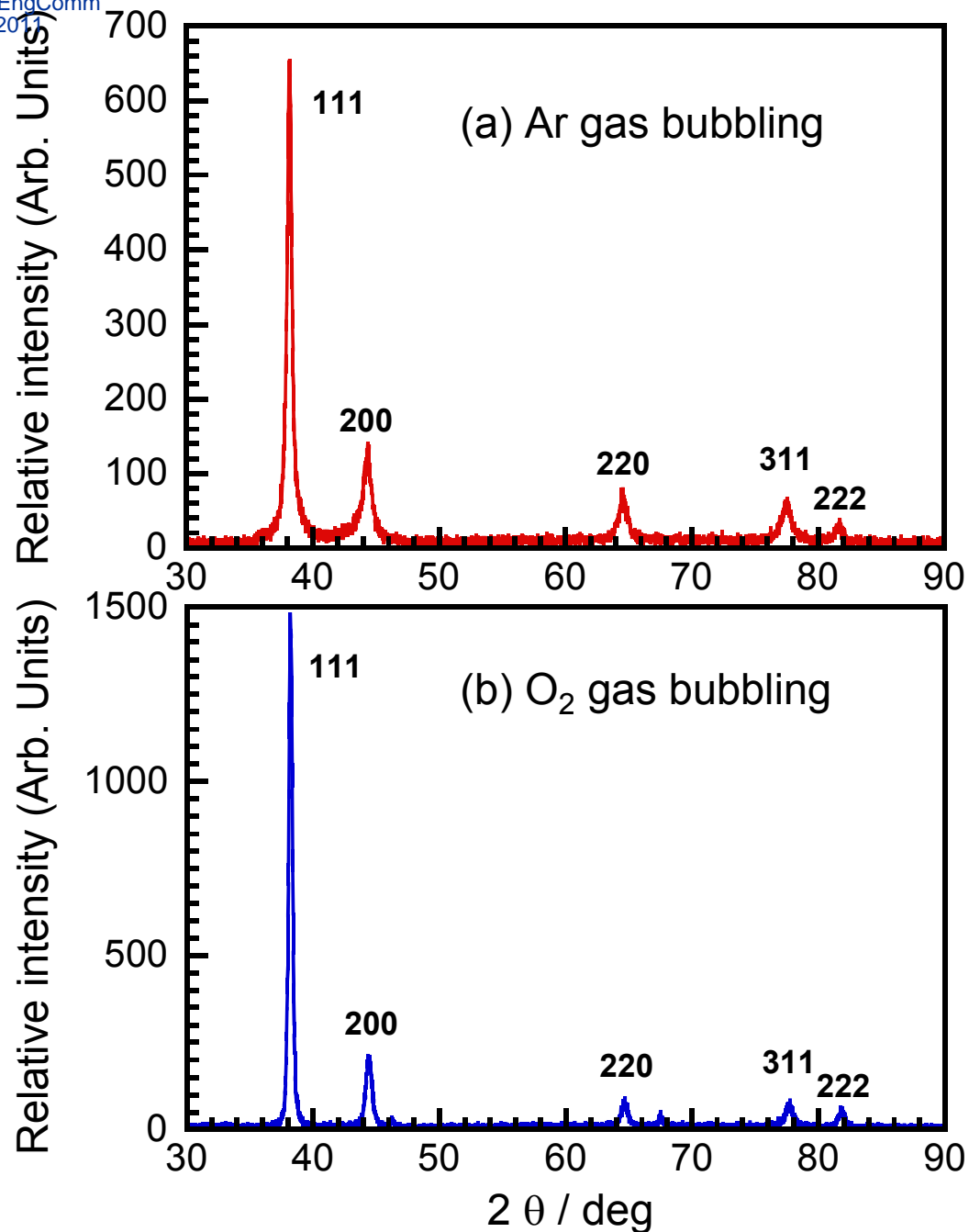
(c) Ag component



(d) Au/Ag component

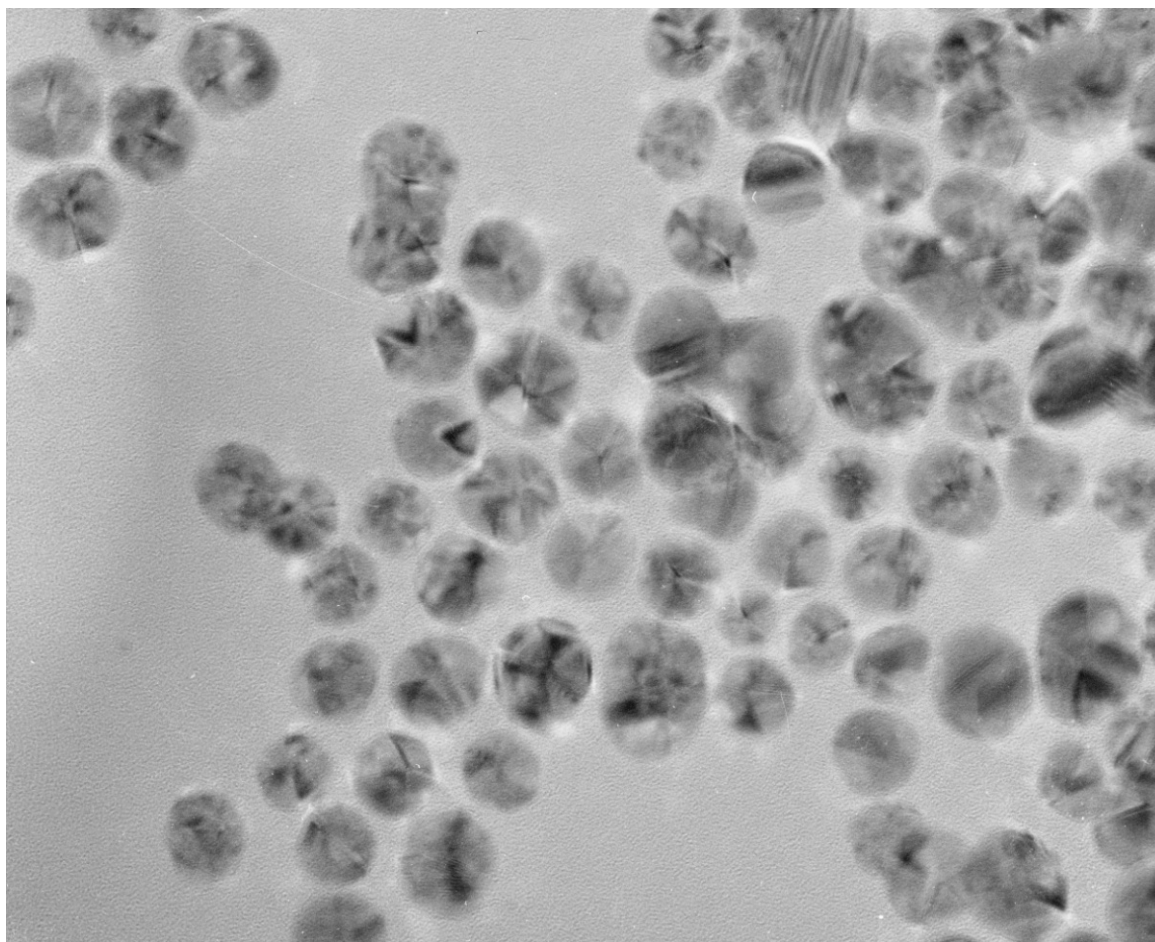


**Fig. S2.** TEM and TEM–EDS data of Au@Ag/Au nanoparticles obtained from Au seeds/AgNO<sub>3</sub>/PVP/EG solution after heating for 10 min under Ar gas bubbling.



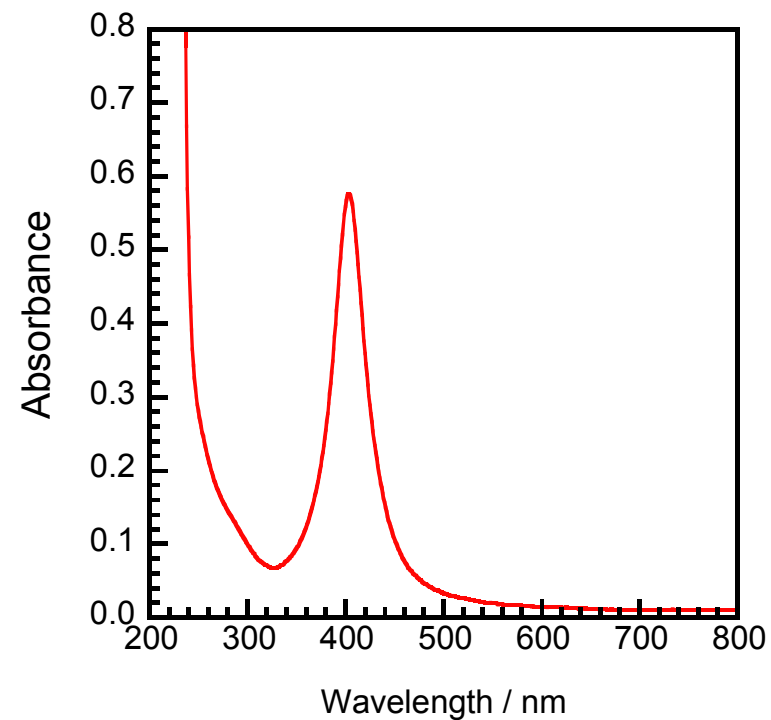
**Fig. S3.** XRD patterns of Au–Ag bimetallic particles obtained from Au seeds/AgNO<sub>3</sub>/PVP/EG solution after heating for 60 min under (a) Ar gas bubbling and (b) O<sub>2</sub> gas bubbling.

(a) TEM

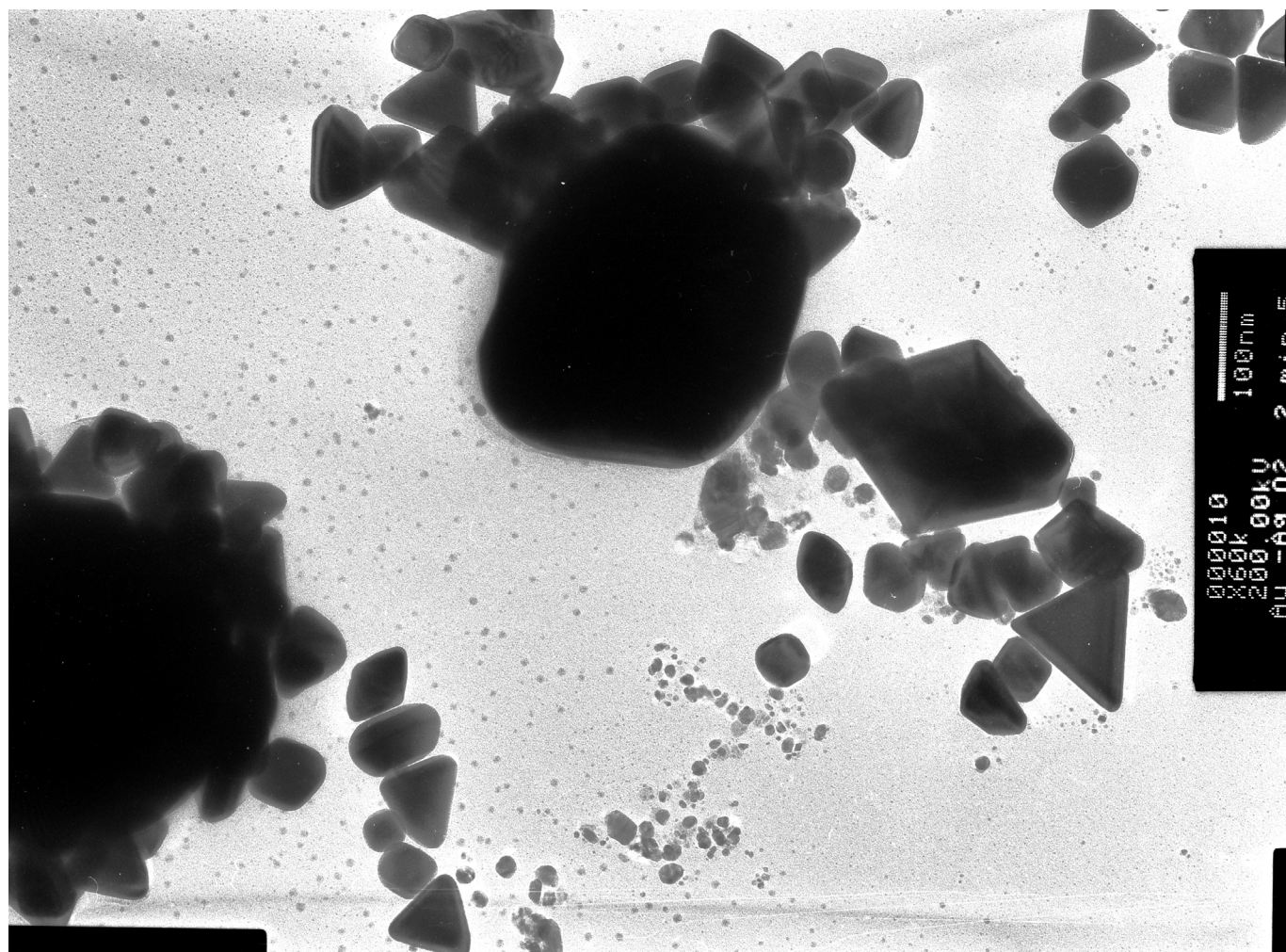


— 20 nm

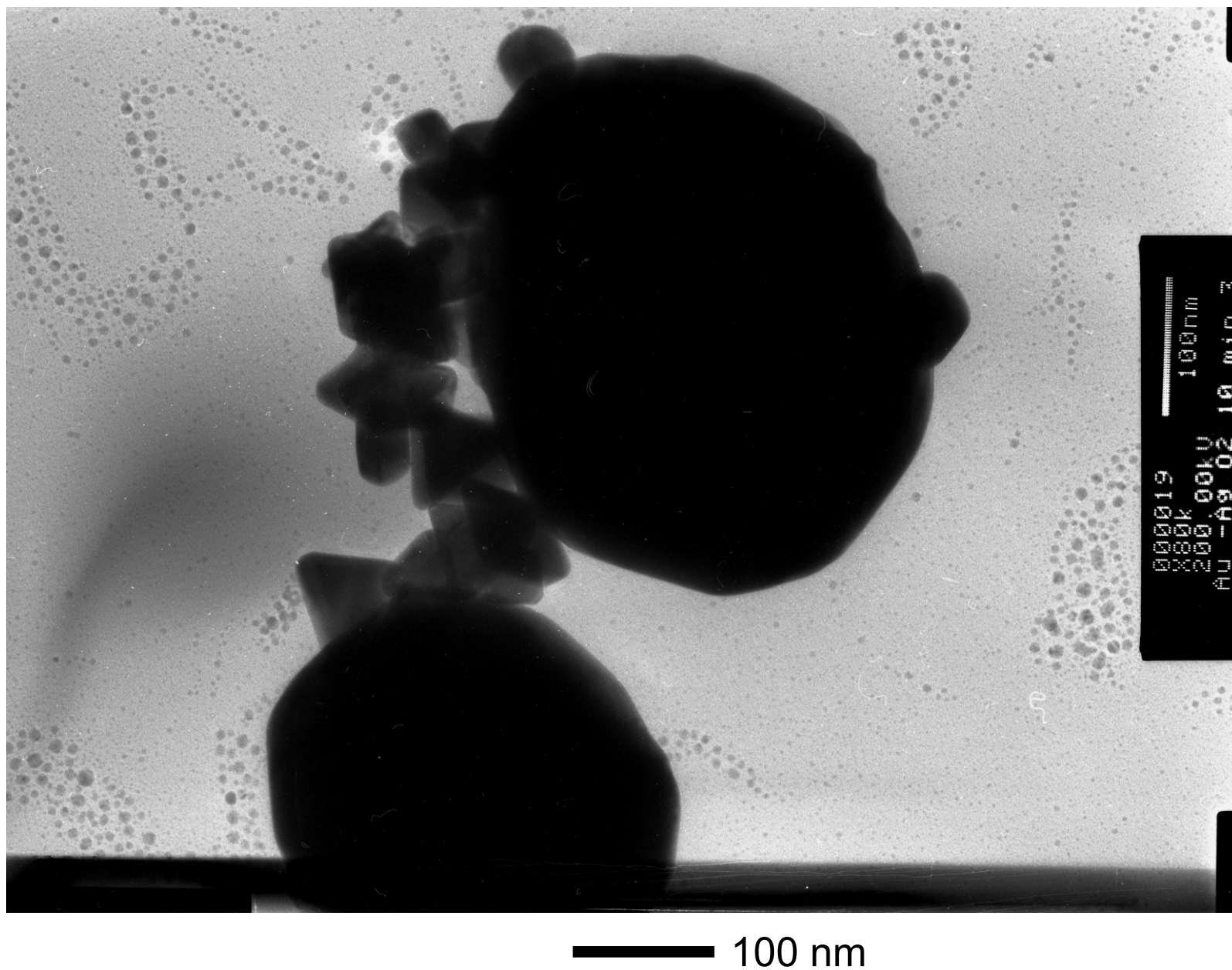
(b) UV-Vis



**Fig. S4.** (a) TEM image and (b) UV-vis spectrum of Ag nanoparticles obtained from  $\text{AgNO}_3/\text{PVP}/\text{EG}$  solution after heating for 10 min under Ar gas bubbling.

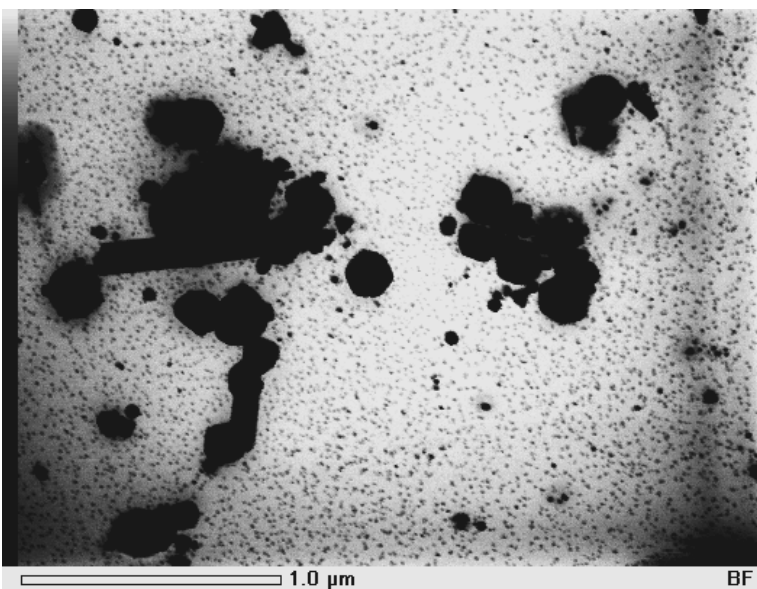


**Fig. S5.** TEM image of Au–Ag bimetallic products obtained from Au seeds/ $\text{AgNO}_3$ /PVP/EG solution after heating for 2 min under  $\text{O}_2$  gas bubbling.

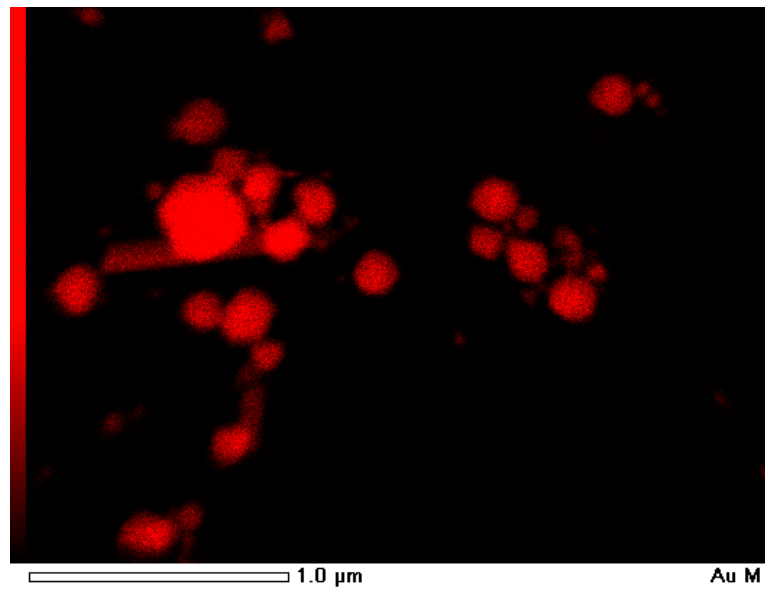


**Fig. S6.** TEM image of Au–Ag bimetallic products obtained from Au seeds/ $\text{AgNO}_3$ /PVP/EG solution after heating for 10 min under  $\text{O}_2$  gas bubbling.

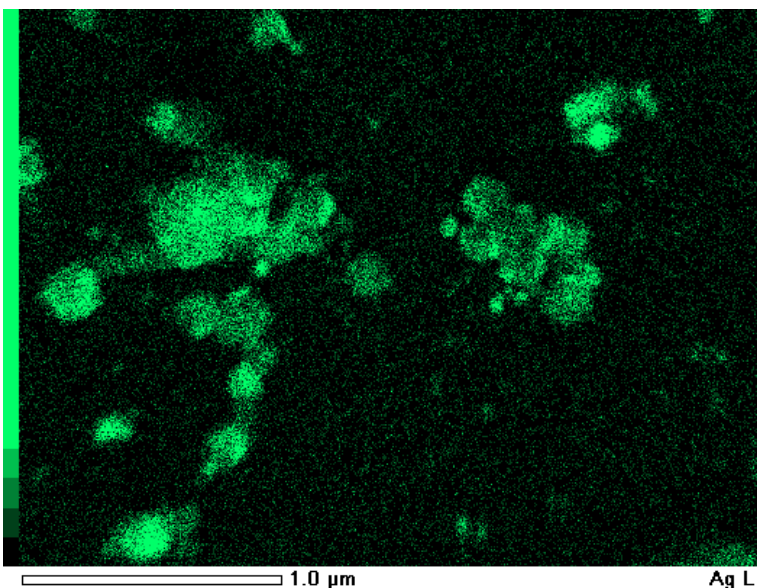
(a) TEM



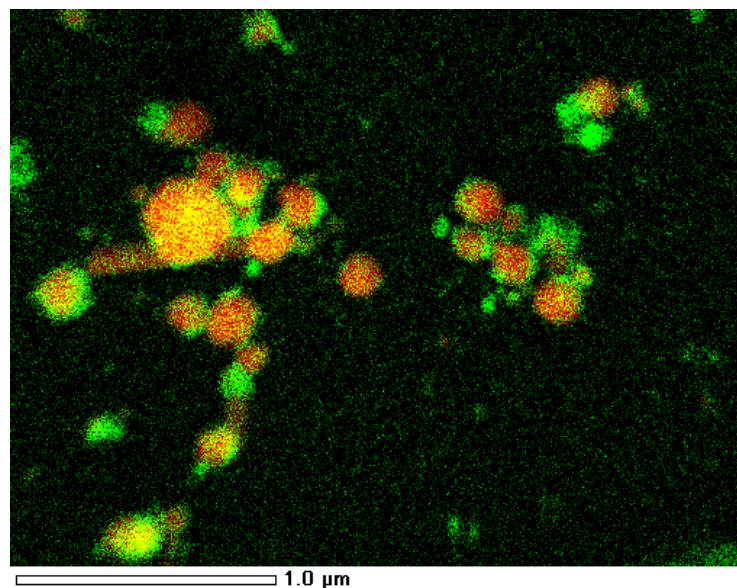
(b) Au component



(c) Ag component



(d) Au/Ag component

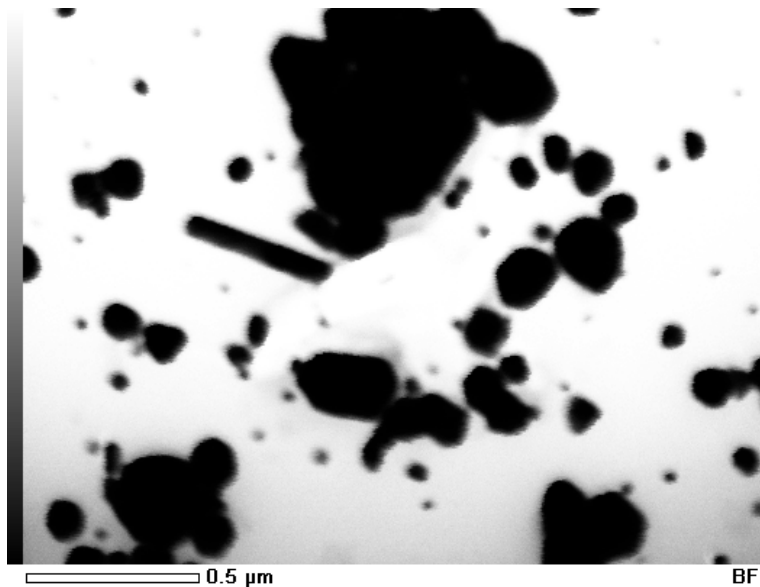


**Fig. S7.** TEM image of Au–Ag bimetallic particles obtained from Au seeds/AgNO<sub>3</sub>/PVP/EG solution after heating for 30 min under O<sub>2</sub> gas bubbling.

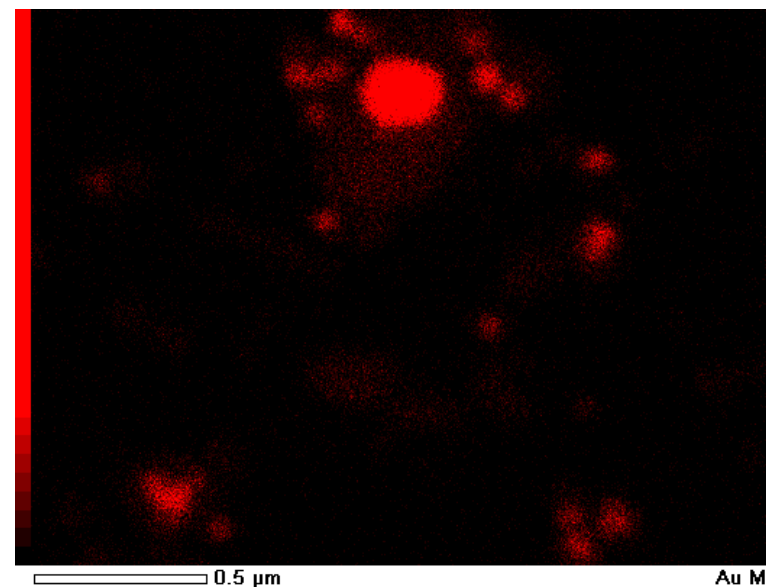




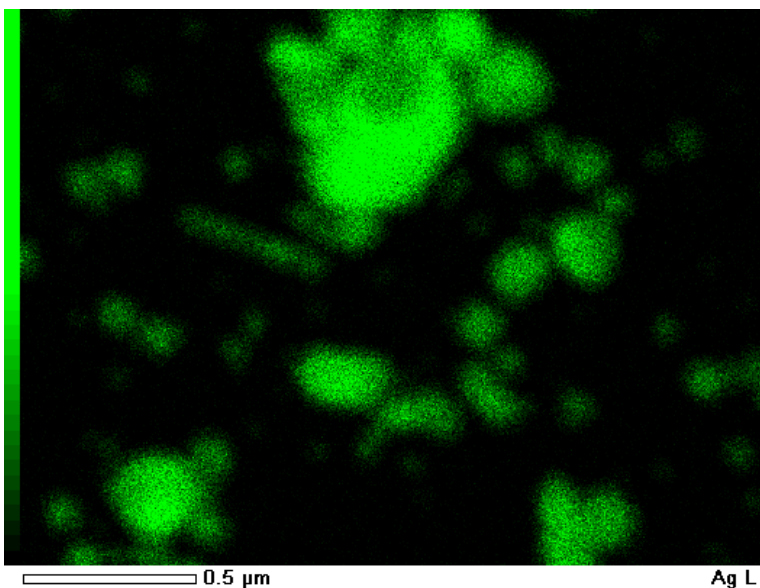
(a) TEM



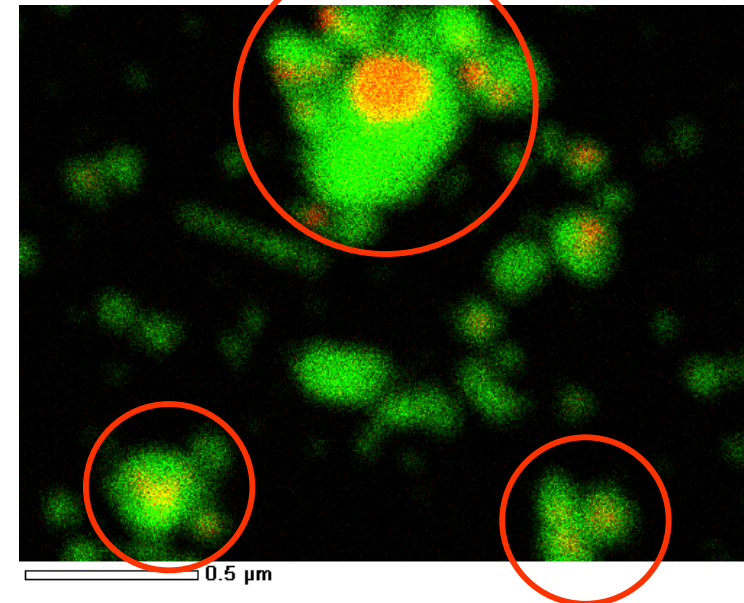
(b) Au component



(c) Ag component



(d) Au/Ag component



**Fig. S9.** TEM image of Au–Ag bimetallic particles obtained from Au seeds/  
AgNO<sub>3</sub>/PVP/EG solution after heating for 30 min under Ar gas bubbling.