Supporting information for:

Pulsed laser irradiation of colloidal nanoparticles: A new synthesis route for the production of the non-equilibrium bimetallic alloy submicrometer spheres.

Zaneta Swiatkowska-Warkocka, Kenji Koga, Kenji Kawaguchi, Hongqiang Wang, Alexander Pyatenko and Naoto Koshizaki*.

Nanosystem Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1 Higashi, Tsukuba, 305-8565 Ibaraki, Japan

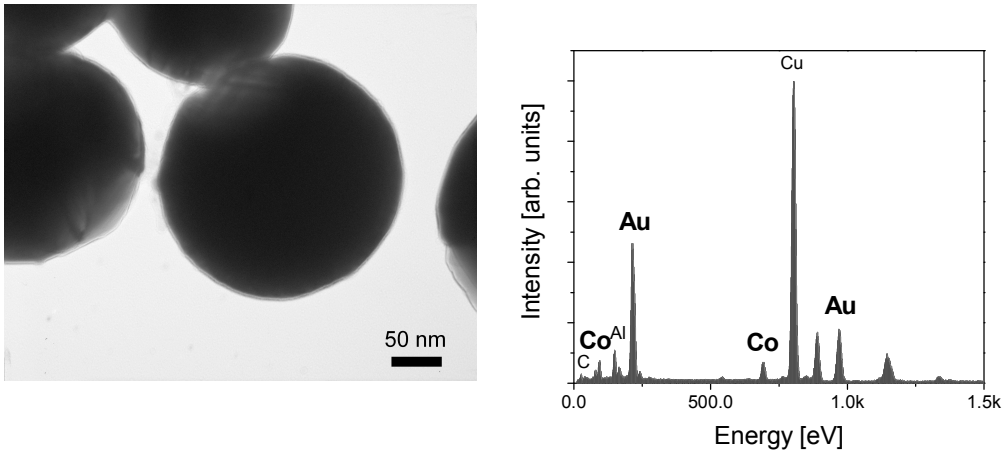


Fig. S1 TEM images for AuCo particles obtained by pulsed laser irradiation and EDS spectrum acquired from a center of single particle.

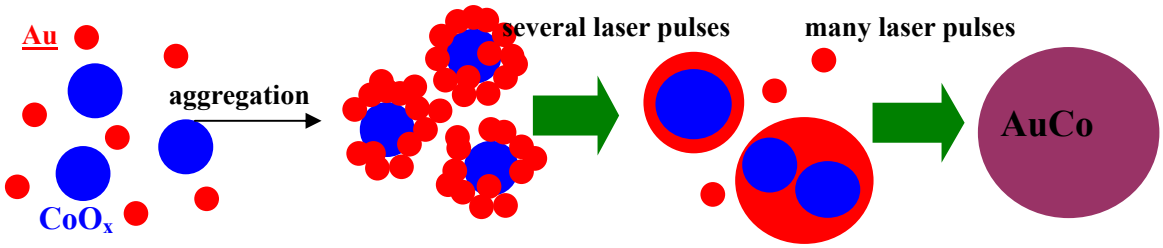


Fig. S2 Scheme of the laser synthesis of AuCo particles using mixture of gold and cobalt oxide nanoparticle colloidal solutions.

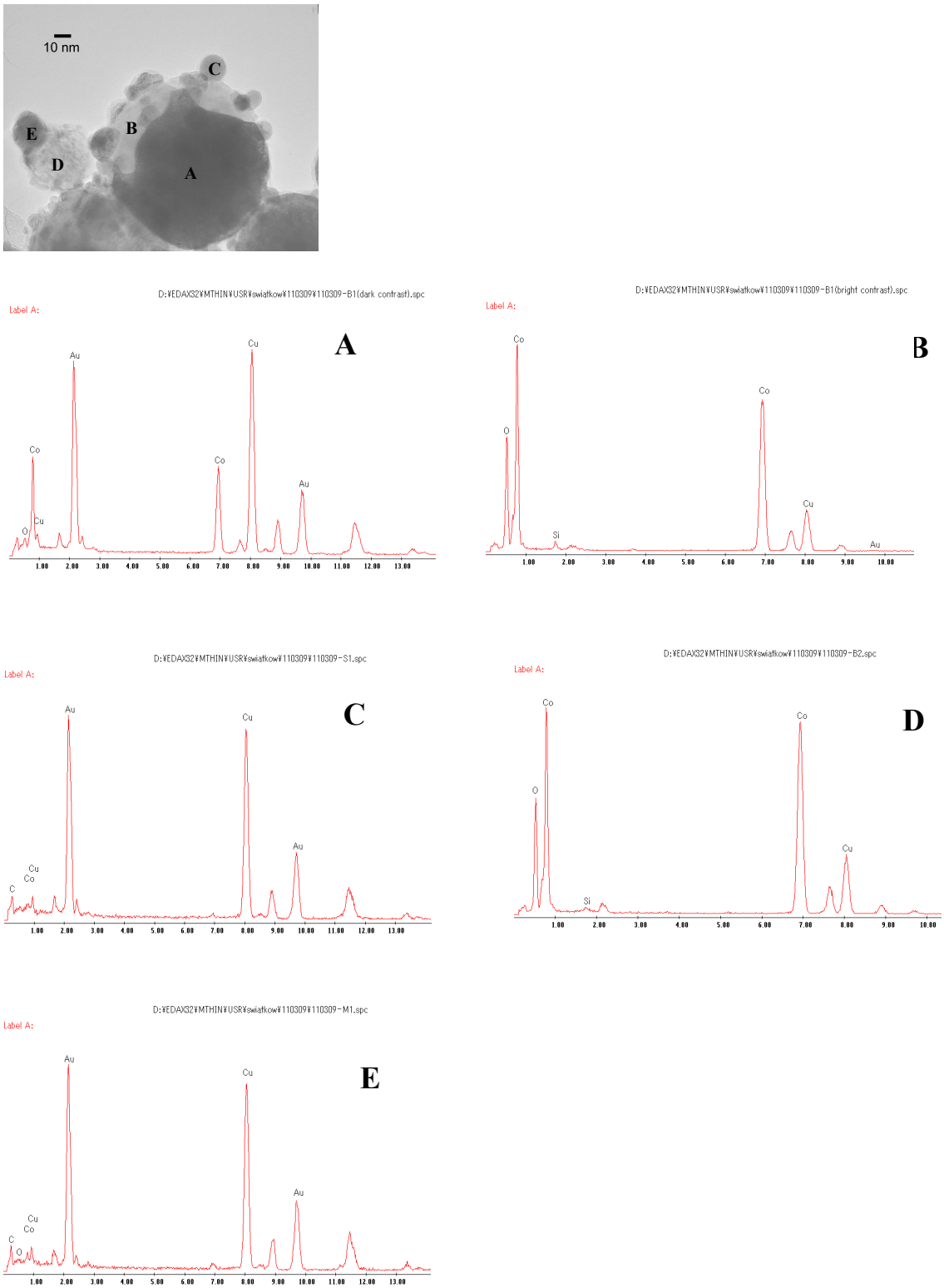


Fig. S3 TEM image of Au/Co-oxides particles after 5 min irradiation and EDS spectra corresponding to different parts of obtained particles.

TEM analyses provided more detailed structural information on the formation of submicrometer particles. Only after 5-min irradiation (Fig. S3 and S4a), the irradiated particles became larger. TEM image clearly shows a contrast difference within the individual particles. EDS spectra recorded at different points of agglomerated nanoparticles show that small (10-15 nm) dark particles (points C, E) are Au nanoparticles, while bright parts of particles (B, D) present both Co and O with atomic ratio of 50:50. A dark large particle (A) about 100 nm in size is composed of Au and Co. The atomic ratio of Co:Au determined by EDS spectra is 47:53.

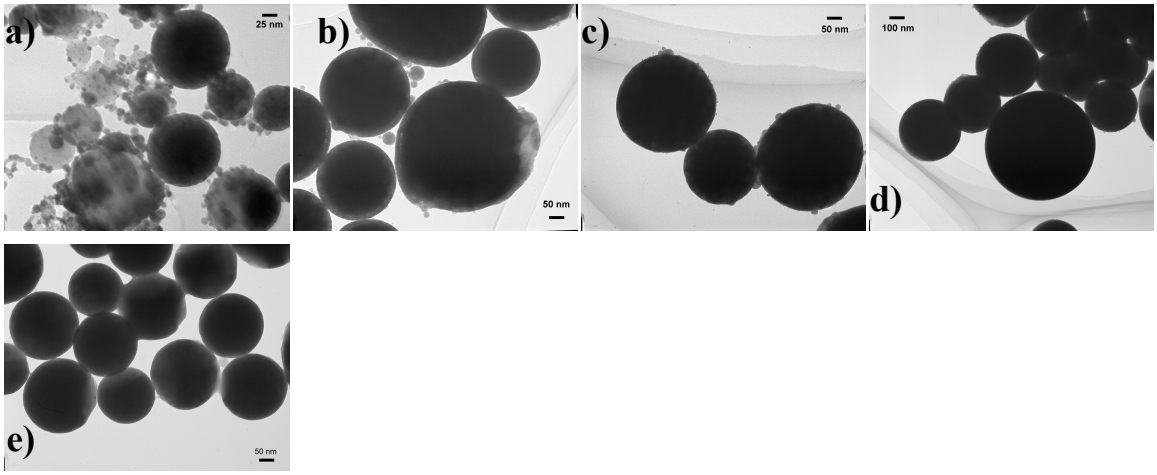
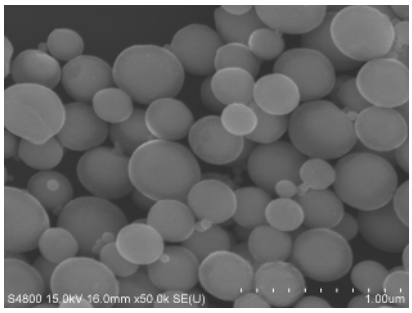
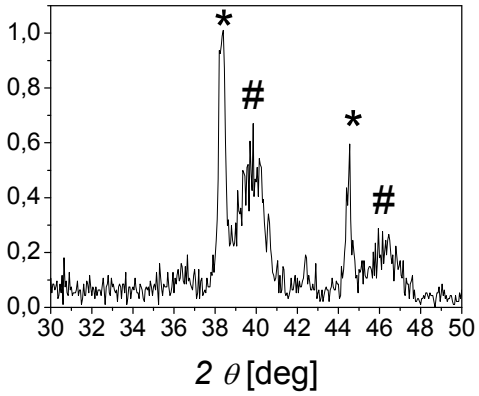


Fig. S4 TEM images of Au/Co-oxides after laser irradiation with various time: a) 5 min, b) 10 min, c) 15min, d) 30 min and e) 60 min.

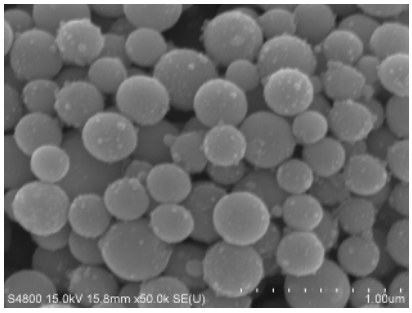
The TEM images show that the number of small particles decreased and the particles became larger with increasing irradiation time. After 60 min of irradiation, only submicrometer particles were observed.

a)





b)



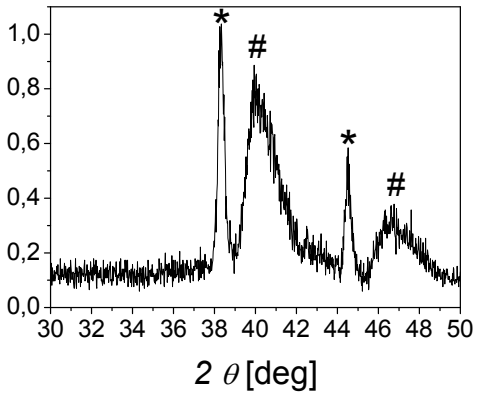


Fig. S5 SEM image and XRD result of a) Au/AuFe particles (*- Au phase, #-Au-Fe phase), and b) Au/AuNi. (*- Au phase, #-Au-Ni phase)