Synthesis of Nano Hybrid Gold/Iron Materials by Synchrotron Radiation Hard X-ray

Sheng-Ling Huang (黃聖伶), Wei-Syuan Lin (林維宣), Wei-Jen Liou (劉維人), and Hong-Ming Lin (林鴻明)

Institute of Physics, Academia Sinica, Taipei, Taiwan

Recently gold/iron oxide composite nanoparticles have attracted much attention as promising biomedical materials. Both gold and iron oxides (magnetite or maghemite) are stable and non-toxic. In this report,the type of nano hybrid gold /iron materials is synthesized in this study. Various exposure time and concentration of the gold precursors, we can obtain different size of gold particle by the National Synchrotron Radiation Research Center(NSRRC) beamline (01A Hard x-ray) facility in Taiwan. Gold/Iron oxide composites were characterized by UV-Visible and TEM analysis.

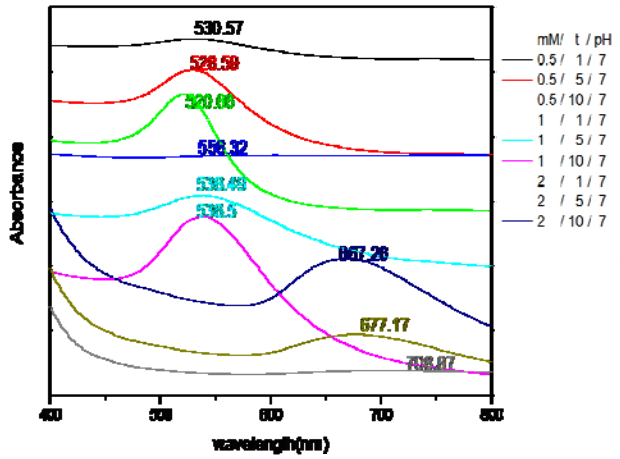

Fig. 1: UV visible spectrum shows the longer of the exposure time and the diluter of the precursor concentration make the smaller gold particle synthesized .

This transmission electron microscopy figure shows the morphlogy of iron/gold nanowire with 2mM $HAuCl_4$ and 5 mins. exposure time. The darker spherical particles were nano gold which was synthesized on iron nanowire.

References

[1] S. Seino, T. Kinoshita, Y. Otome, and T. Nakagawa, Journal of Magnetism and Magnetic Materials **293**, 144 (2005).

[2] T. Tsonchev, L. Ivanova , A. R. Lotz , and J.-H. Smatt, Catalysis Communications **8,** 1573 (2007).

[3] S. Rohart, Y. Girard, Y. Nahas, V. Repain, G. Rodary, A. Tejeda, and S. Rousset, Surface Science **602**, 28 (2008).

[4] R. Salvati, A. Longo, G. Carotenuto, and S. De Nicola, Applied Surface Science **248,** 28 (2005).

[5] K. Kawaguchi, J. Jaworski, Y. Ishikawa, T. Sasaki, and N. Koshizaki, IEEE TRANSACTIONS ON MAGNETICS **42**, NO. 10 (2006).