

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Chemical attachment of magnetic nanoparticles through “click chemistry”**<sup>1</sup> YUE LIU, ANDREW Y. TEPLYAKOV, Department of Chemistry & Biochemistry, University of Delaware, GEORGE C. HADJIPANAYIS, Department of Physics & Astronomy, University of Delaware — Iron nanoparticles were used as a test system to explore the functionalization and attachment of magnetic nanoparticles with two different functionalities through “click chemistry.” Two different samples of iron nanoparticles were modified with 5-azidopentanoic acid and with 5-hexynoic acid, respectively. This modification was followed by click chemistry to change the morphology of agglomeration. A combination of density functional theory calculations, Fourier-transform infrared spectroscopy, and X-ray photoelectron spectroscopy was used to monitor each step of the process. Spectroscopies confirmed the success and completion of click reaction. Scanning electron microscopy images showed the change in size and morphology of the iron nanoparticles before and after click chemistry. Vibrating sample magnetometer study showed the majority of the magnetic properties were retained following functionalization and click reaction. Exploring similar approach for two types of materials with functionalization and attachment of hard magnetic materials and soft magnetic materials will be presented based on our initial studies of SmCo nanoparticles in a combination with iron nanoparticles.

<sup>1</sup>Work supported by DOE ARPA-E.

Yue Liu  
University of Delaware

Date submitted: 13 Nov 2012

Electronic form version 1.4