



## EMSL User Spins Gold (and Cobalt) into Potential Biomedical Application

A graduate student from the University of Washington recently used state-of-the-art high-resolution transmission electron microscopy (HRTEM) at EMSL's Interfacial and Nanoscale Science Facility (INSF) to investigate the fine structure of gold-coated cobalt magnetic nanoparticles. Development of such materials may translate into useful and important biomedical diagnoses applications needed to enhance detection of diseases such as cancer.

Yuping Bao is part of a research group led by Kannan Krishnan, a Campbell Chair Professor in the university's Materials Science and Engineering Department. Hosted by EMSL researcher and collaborator Chongmin Wang, Bao spent her three-day visit obtaining HRTEM images of the atomic structure of cobalt and gold-coated cobalt magnetic nanoparticles that were synthesized in Krishnan's laboratories at the University of Washington.

Cobalt nanoparticles possess high-magnetic moment—meaning each particle consists of a single crystal that provides supermagnetic properties—which can lead to a significant increase in the sensitivity of sensing capabilities. However, because these nanoparticles are toxic, they must be interfaced with biocompatible materials—in the case of Bao's research, gold. When cobalt is coated with gold, a core-shell structure is produced that can effectively be functionalized to detect or sense a specific antigen in the body by measuring the magnetic signal of the nanoparticle. Images acquired by the HRTEM allowed Bao and Wang to clearly examine the core-shell structure and confirmed that synthesis of the nanoparticle material at Krishnan's laboratories is successful.

Bao cites excellent past collaborations between EMSL and the University of Washington, EMSL's cutting-edge HRTEM capabilities, and a convenient distance to travel—along with expert resources—as reasons she was attracted to the user facility.

“EMSL staff were extremely helpful and supportive of my research—especially Dr. Wang,” Bao says, adding that she hopes to return to EMSL next spring to resume collaborations and again take advantage of EMSL's advanced instrumentation for her research.

For more information, contact Chongmin Wang (509-376-4292).

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