Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Study of gold nanoparticle synthesis by synchrotron x-ray diffraction and fluorescence[1] ZHONGYING YAN, XIAO WANG, LE YU, Bryn Mawr College, SINA MOEENDARBARI, YAOWU HAO, University of Texas at Arlington, ZHONGHOU CAI, Argonne National Laboratory, XUEMEI CHENG, Bryn Mawr College — Gold nanoparticles have a wide range of potential applications, including therapeutic agent delivery, catalysis, and electronics. Recently a new process of hollow nanoparticle synthesis was reported, the mechanism of which was hypothesized to involve electroless deposition around electrochemically evolved hydrogen bubbles. However, the growth mechanism still needs experimental evidence. We report investigation of this synthesis process using synchrotron x-ray diffraction and fluorescence measurements performed at beamline 2-ID-D of the Advanced Photon Source (APS). A series of gold nanoparticle samples with different synthesis time (50-1200 seconds) were deposited using a mixture electrolyte solution of $Na_3Au(SO_3)_2$ and $H_4N_2NiO_6S_2$ on anodic aluminum oxide (AAO) membranes. The 2D mapping of fluorescence intensity and comparison of x-ray diffraction peaks of the samples have provided valuable information on the growth mechanism.

[1]Work at Bryn Mawr College and University of Texas at Arlington is supported by NSF grants (1207085 and 1207377) and use of the APS at Argonne National Laboratory is supported by the U. S. Department of Energy under Contract No. DE-AC02-06CH11357.

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Date submitted: 05 Nov 2015 Electronic form version 1.4