

Abstract Submitted
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Elemental Specific Study on FeCo-Au nanoparticles¹ NIAN JI, YUNHAO XU, JIAN-PING WANG, The Center for Micromagnetics and Information Technologies (MINT), University of Minnesota, WANG'S TEAM — Core-shell type nanoparticles are a topic of interest due to its diverse magnetic properties such as coercivity enhancement² and exchange bias.³ At the core-shell interface, the orbital magnetism is expected to change due to the symmetry broken, which could be substantial on the overall magnetic performance in nanoparticle system given its large surface to volume ratio. Here we present elemental specific and chemical selective XMCD study on high magnetic moment FeCo-Au core-shell nanoparticles, which are synthesized from a one-step gas condensation sputtering method. It is found the orbital magnetic moment of Fe and Co response differently when both elements are subject to the same broken symmetry. The spin and orbital magnetic moment on Fe and Co are determined according to XMCD sum rule, respectively. Giant orbital magnetic moment is observed on Co L edge while no significant change is found on Fe case. This finding hints at the necessary modification of Slater-Pauling curve of systems in nanoscale, pointing at a new direction on searching high materials with high magnetic moment.

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²J. Nogués et al., Phys. Rep. 422, 65 (2005)

³O. Iglesias, et al., J. Nanosci. Nanotechnol. 8, 2761 (2008)

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