

Abstract Submitted
for the 4CF12 Meeting of
The American Physical Society

Structural and magnetic behavior of Fe_3O_4 nanoparticles KARINE CHESNEL, MATEA TREVINO, YANPING CAI, BYU, Physics, BETSY OLSEN, STACEY SMITH, ROGER HARRISON, BYU, Chemistry — The study of magnetic nanoparticles grows rapidly because of its wide range applications: ultrahigh density recording media, quantum information devices, biomedicine etc. When their size is down to few nanometers, magnetic particles exhibit interesting superparamagnetic behaviors, where each particle carries a single macrospin. We investigated various chemical routes to synthesize our Fe_3O_4 ferrimagnetic nanoparticles, and characterized their structural properties by XRD and magnetic properties with VSM magnetometry. We were able to identify the structure and size of nanoparticles, ranging from 5 to 50nm. We also studied their bulk magnetic behavior under field cooling and zero field cooling measurements to identify a superparamagnetic phase transition. Finally, we have deposited the particles onto membranes to let them self-assemble and form a thin layer, and have studied the structure of the self assemblies by TEM imaging.

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Date submitted: 21 Sep 2012

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