

Abstract Submitted
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Synthesis and characterization of iron nanoparticles by high-pressure sputtering. JEFFREY CARVELL, ELIJAH AYIETA, RIUHUA CHENG, Indiana University Purdue University Indianapolis — The study of magnetic nanoparticles is interesting because of its importance and applications in the production of nano-electromechanical systems (NEMS) and micro-electromechanical systems (MEMS). We use a sputtering technique to deposit iron nanoparticles on a silicon substrate. The nanoparticles are then analyzed using atomic force microscopy (AFM), x-ray diffraction, and superconducting quantum interference devices (SQUID). AFM data shows that the size of the particles depends on different deposition conditions. Then, x-ray diffraction data shows that the nanoparticles adopt the body-centered cubic crystal structure. Finally, SQUID measurements were performed to characterize the magnetic properties of the nanoparticles. Systematic change in the magnetic properties was observed for particles with different sizes. The results show that the size and magnetic properties could be tuned by changing the deposition conditions.

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