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**High Coercivity Anisotropic Nd2Fe14B Nanoparticles Produced by Planetary Ball Milling**[1] OZLEM KOYLU-ALKAN, GEORGE C. HADJIPANAYIS, Department of Physics and Astronomy, University of Delaware, Neark, DE, USA, DIMITRIS NIARCHOS, IMS, Demokritos, Athens, Greece — The bottom-up fabrication of anisotropic exchange-coupled nanocomposites brings out the necessity of fabrication of magnetically hard nanoparticles with high coercivity. In this study, we have fabricated $Nd_2Fe_{14}B$ nanoparticles from die-upset Nd-Fe-B (MQ3) precursor materials using planetary milling. The MQ3 alloy consists of platelets which are approximately 80 nm in thickness and 500 nm in diameter. Using planetary ball milling we were able to produce $Nd_2Fe_{14}B$ nanoparticles with a size down to 20 nm. However, the size distribution of the milled particles is very broad ranging between 20 nm and 20 $\mu m$. A sedimentation experiment was used to separate the different size particles. By allowing bigger particles to sediment in a viscous liquid, we were able to separate different size nanoparticles with a size smaller than 200 nm. The coercivity of particles is found to decrease with particle size. After 60 min sedimentation the collected particles had an average size 100 nm with a coercivity value of 5.4 kOe. The objective of this study is to obtain nanoparticles with a size below 100 nm and a coercivity greater than 10 kOe for the fabrication of anisotropic exchange-coupled nanocomposites.

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