Abstract Submitted
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**Submicron sized R2Fe14B particles fabricated by mechanochemical process**[1] OZLEM KOYLU-ALKAN, Department of Physics and Astronomy, University of Delaware, Newark, DE, USA, JOSE MANUEL BARANDIARAN, BCMaterials, Technology Park of Biscay E-48160 Derio, Spain Dept. Electricity Electronics, Univ. Basque Country (UPV/EHU) E-48080 Bilbao, Spain, DANIEL SALAZAR, BCMaterials, Technology Park of Biscay E-48160 Derio, Spain, GEORGE C. HADJIPANAYIS, Department of Physics and Astronomy, University of Delaware, Newark, DE, USA, UNIV. OF DELAWARE TEAM, UNIV. BASQUE COUNTRY TEAM — In this work, we have synthesized submicron $R_2Fe_{14}B$ particles by the mechanochemical process. Mechanical activation of oxides of rare earth, iron and boron was done by high energy ball milling in a CaO with a reduction agent (Ca). After a heat treatment at 900 C the powder was washed with water and glycerol solution to remove the dispersant and other non-magnetic phases. Magnetic measurements showed that the as-synthesized unwashed powders had coercivity values of 10.3 kOe, 12.8 kOe, and 24.6 kOe for R=Nd, Pr, and Dy, respectively. During washing, $H_2$ is released and absorbed by the 2:14:1 structure. After removing the $H_2$, the submicron particles have coercivities of 3.3 kOe (Nd), 4.4 kOe (Pr) and 21.0 kOe (Dy) with average sizes 160 nm, 242 nm, and 107 nm, respectively. Fitting of high field M(H) measurements to the law of approach to saturation showed that the anisotropy constant of the $Nd_2Fe_{14}B$ particles are $3.73 \times 10^7$ erg/cm$^3$ which is comparable to bulk. Work supported by DOE DE-FG02-04ERU4612 and Bizkaia Talent AYD-000-195.

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