

**Magnetic and Structural Properties of Nd<sub>2</sub>Fe<sub>14</sub>B/ $\alpha$ -Fe Nanocomposites Obtained by Mechanical Milling and Annealing**

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In exchange nanocomposite magnets, hard and soft phases are coupled via interfacial exchange interactions. The magnetic nanocomposites were obtained by mechanical milling. The structure and microstructure are resolved by two different post milling heat treatments: long time annealing at about 550°C and flash annealing (from 0.5 to 3 minutes) at higher temperature. The structural and magnetic properties of Nd<sub>2</sub>Fe<sub>14</sub>B/ $\alpha$ -Fe nanocomposite were studied for different soft ratios ranging from 5 to 22 wt% and different type of annealing. The structural modifications of the samples were studied by X-ray diffraction (XRD). The microstructure was checked by XRD and electron microscopy. The stiffness of the soft/hard interphase exchange coupling, the remanent magnetization, the coercive field and the exchange coupling between the hard and the soft grains were deduced from room temperature magnetic measurements, performed in magnetic fields up to 10 T.

9.7 cm

13.4 cm

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