

Study of the exchange coupling in SmCo_5 /(Fe and Fe-Co) magnetic nanocomposites

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Hard magnetic soft/hard nanocomposites have the benefit of the strong coercivity from the hard magnetic phase and the high magnetization given by the soft phase. Mechanical milling is an appropriate technique to produce hard/soft composite. The structure and microstructure are resolved by the post milling annealing. We used two different soft magnetic phases, iron and $\text{Fe}_{65}\text{Co}_{35}$ alloy respectively, in combination with SmCo_5 hard magnetic phase. We present a systematic research of the influence of milling and annealing conditions on the structural and magnetic properties in the composite. One of the major points of our research consists in the study of the crystallite dimension evolution vs. synthesis. The structural modifications of the samples were investigated 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 magnetisation and the coercive field were deduced from hysteresis curves, performed in magnetic fields up to 10 Tesla at 300 K.

9.7 cm

13.4 cm

Subject category :

6. Soft and Hard Magnetic Materials

Presentation mode :

poster

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