# Magnetic anisotropy in Fe-Nb-B-RE amorphous alloys

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The presented work refers to the magnetic anisotropy properties of Fe-Nb-B-RE (RE = Tb, Nd, Tb/Y) amorphous alloys. The samples (i.e. $(Fe_{80}Nb_6B_{14})_{1-x}RE_x$, $0.04 < x < 0.12$) were prepared by a typical melt-spinning technique. The occurrence of the amorphous state was confirmed by XRD and thermomagnetic measurements. Some selected magnetic properties and domain structure were determined from hysteresis loops (measured at different temperatures) and Kerr effect (MOKE) observations. The Fe-Nb-B family of amorphous alloys is widely known as an excellent soft magnetic material (e.g. the so-called NANOPERM type of alloys) with extremely low power losses and coercivity [1]. Despite the lack of crystal structure such alloys reveal ferromagnetic ordering of Fe magnetic moments. On the other hand, some rare earth elements can introduce magnetic anisotropy into many Fe-RE structurally ordered compounds as a consequence of strong spin-orbit coupling [2,3]. It is interesting to see whether the RE alloying additions can cause magnetic anisotropy in the case of amorphous Fe-based magnets and how they influence the magnetic structure as well as the interactions between magnetic atoms. It was shown that the applied RE additions has an effect on magnetic properties such as coercivity, the Curie temperature and domain structure. Surprisingly, the small addition of localized magnetism, introduced by the RE elements, significantly changed the magnetic exchange interactions between the Fe atoms, which is widely discussed based on the numerical analysis utilizing the mean field theory (MFT) approach.

**References:**

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