

# Magnetization processes of hard magnetic composites – Monte Carlo studies

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Magnetic materials are very important in nowadays technologies. New and continuously increasing requirements can be fulfilled by modern nanostructured magnetic composites containing phases characterized by different magnetic properties. Recently, we reported ultra-high coercivity ( $> 7$  T) in Fe-Nb-B-Tb type of bulk nanocrystalline alloys. It was shown that in such materials the interactions between soft and hard magnetic phases with specific irregular branches are especially important and can lead to an appearing of new and unique properties. A better understanding the interactions in such systems is interesting from scientific and application point of view. In the present work we performed some simulated annealing plus Monte Carlo studies concerning a spherical particles embedded into ferromagnetic matrix as well as irregular branches of soft and hard magnetic phases. Magnetization process of such system depends on exchange interactions of soft and hard magnetic object and interface between them. Especially interesting is the comparison of interactions in systems with different, regular and irregular geometry. Moreover, the influence of different kind of anisotropy is also widely discussed.