A micromagnetic model of multilayer nanocomposite magnet

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Micromagnetic calculation using a discrete model was applied to numerical simulation of the magnetic properties of nanocomposite multilayers magnet. The effect of the magnetic coupling and the intergrain exchange interaction on magnetic properties was studied. We reported the magnetic properties of Fe/NdFeB multilayers. The stable direction of magnetization was determined for a given value of applied field by minimizing magnetic energy stored in the magnet. Rotation of magnetization called out by changes of applied field, was calculated by integrating the Gilbert's equation. In general, our approaches find that the most important parameter is characterizing reversal process is the dimension of the soft phase. For layer thickness values less than exchange length, the two phases are rigidly coupled and the composite system is characterized by the averaged magnetic properties with anisotropy, magnetization and thickness values of the soft and hard layers. For thicker soft layers, the coercivity of the soft layers drops quickly, which degrades the hard magnetic properties of the composite system.

9.7 cm

13.4 cm

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