Magnetization processes in a multilayer nanocomposite magnet

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We report the simulated magnetic properties of Fe/NdFeB multilayers. The stable direction of magnetization was determined for a given value of applied field by the magnet total energy minimization. Rotation of magnetization caused by changes of applied field was calculated by integrating the Gilbert's equation.

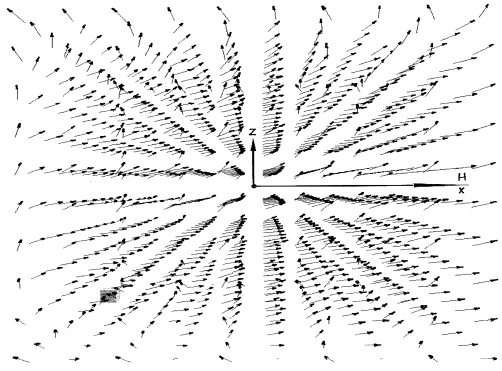

Fig. 1. The distribution of magnetic moments of the grains at the reverse external field –2.7 MA/m and grain size of 4 nm.

For layer thickness smaller than exchange length defined by $\sim\pi(A/K)^{1/2}$, the two phases are rigidly coupled and the composite system is characterized by the averaged magnetic properties: 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.

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