THE DIPOLAR CONTRIBUTIONS TO THE MAGNETOELASTIC ENERGY OF CRYSTAL GRAINS WITH INTERFACES

T. Szumiata[a], R. Żuberek[b], H. Szymczak[b] and J. Gonzales[c]

[a]Department of Physics, Technical University of Radom
ul. Malczewskiego 29, PL 26-600 Radom, Poland
[b]Intitute of Physics, PAS, al. Lotnikow 32, 02-668 Warsaw, Poland
[c]Departamento de Fisica de Materiales, Universidad del Pais Vasco
Paseo Manuel de Lardizabal, 3, 20009 San Sebastian, Spain

9.7 cm

The magnetic anisotropy and magnetostriction in nanocrystalline grains in nonmagnetic or magnetic matrix (nanoparticles or nanocrystalline materials) differ from their bulk properties. The interactions between atoms at the interface play the important role in these magnetic properties. In this paper the magnetoelastic energy in crystal grains with different interfaces have been calculated in frame of dipolar magnetic interactions. A crystal grain has been defined as a sphere cut out with bcc or fcc crystalline structure. The surrounding spherical layer of the interface has the same crystalline structure but different magnetic moment of atoms. Total magnetoelastic energy of the sphere interface system is a sum of magnetoelastic energy of the sphere itself, energy of the interactions between the sphere and the interface and also energy of the interface itself. It has been shown that magnetoelastic energy depends on the sphere size and thickness of the interface layer.

13.4 cm

Subject category :

2. Magnetic Films, Surfaces and Multilayers

Presentation mode :
poster

Corresponding author :
T. Szumiata

Address for correspondence :
Department of Physics, Technical University of Radom
ul. Malczewskiego 29, PL 26-600 Radom
Poland

Email address :
szumiatt@kiux.man.radom.pl