

Structural, magnetic and Mossbauer studies of Fe-Cu granular films

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Abstract: X-ray diffraction, magnetization and Mossbauer effect investigations have been performed for the sputtered Fe_{0.2}Cu_{0.8} thin films. A segregation forming isolated body-centred cubic Fe grains in the face-centred cubic Cu matrix with an average diameter between 1 and 40 nm took place upon annealing in the temperature range from 100 to 500  C. In addition, the magnetic coercive field is found to be enhanced and reaches a value of 37 mT for the sample annealed at 400  C. A perpendicular surface anisotropy constant $K_S = 0.04 \text{ mJ m}^{-2}$ is deduced. Surface spin configurations are discussed for the granular films investigated.

Index Keywords: Annealing; Coercive force; Energy dispersive spectroscopy; Grain size and shape; Granular materials; Magnetic anisotropy; Magnetic field effects; Magnetization; Sputter deposition; Thin films; X ray diffraction analysis; Mossbauer effects; Surface spin configurations; Iron compounds

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References:

1. Chien, C.L., (1991) J. Appl. Phys., 69, p. 5276
2. Xiao, J.Q., Jiang, J.S., Chien, C.L., (1992) Phys. Rev. Lett., 68, p. 3749
3. Xiao, G., Chien, C.L., (1987) Appl. Phys. Lett., 51, p. 1280
4. Chen, C., Kitakami, O., Shimada, Y., (1998) J. Appl. Phys., 84, p. 2184
5. Hayashi, T., Hirono, S., Tomita, M., Umemura, S., (1996) Nature, 381, p. 72
6. Murayama, T., Miyamura, M., Kondoh, S., (1994) J. Appl. Phys., 76, p. 5361
7. Chen, C., Kitakami, O., Shimada, Y., (1999) J. Appl. Phys., 86, p. 2161
8. Childress, J.R., Chien, C.L., Nathan, M., (1990) Appl. Phys. Lett., 50, p. 95
9. Gangopadhyay, Y., Hadjipanayis, G.C., Dale, B., Sorensen, C.M., Klabunde, K.J., Papefthymiou, V., Kostikas, A., (1992) Phys. Rev. B, 45, p. 9778
10. Aloh, C., Stahl, B., Ghafari, M., Hahn, R., (2000) J. Appl. Phys., 88, p. 4212
11. Eilon, M., Dong, J., Street, R., (1995) J. Phys.: Condens. Matter, 7, p. 4921
12. Skomski, R., (1998) IEEE Trans. Magn., 34, p. 1207
13. Gradmann, U., (1993) Handbook of Magnetic Materials, 7, pp. 1-95. , ed K H J Buschow (Amsterdam: Elsevier)
14. Givord, D., McGrath, O.F.K., Meyer, C., Rothman, J., (1996) J. Magn. Magn. Mater., 157-158, p. 245
15. Hernando, A., G  mez-Polo, C., El Ghananami, M., Garc  a Escorial, A., (1997) J. Magn. Magn. Mater., 173, p. 275

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