

Structural and magnetic studies of sputtered $\text{Fe}_{1-x}\text{Cr}_x$ thin films

Duc N.H., Fnidiki A., Teillet J., Ben Youssef J., Le Gall H.

Cryogenic Laboratory, Faculty of Physics, National University of Hanoi, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam; Lab. de Magnet. et Applications, GPM-UMR 6634, Universit   de Rouen, 76821 Mont-Saint-Aignan, France; Groupe des Laboratoires de Bellevue, CNRS, 92195 Meudon Cedex, France

Abstract: X-ray diffraction, magnetization, and M  ssbauer effect investigations have been performed for sputtered $\text{Fe}_{1-x}\text{Cr}_x$ ($0 \leq x \leq 0.54$) thin films. The body-centered-cubic (bcc) phase appears for $x < 0.32$, while the γ phase is formed for $0.38 \leq x \leq 0.44$. For $0.32 \leq x < 0.38$ and $0.44 < x \leq 0.54$, the samples are composed of both bcc and γ phases. As the Cr concentration increases, the ferromagnetic fraction, magnetization, and magnitude of the hyperfine field decrease, whereas the magnitude of the isomer shift increases. The Fe and Cr magnetic moments, isomer shift, and hyperfine field of the bcc Fe-Cr phase have been deduced and are discussed consistently in terms of charge and spin distributions, as well as magnetic valence.    2000 American Institute of Physics.

Year: 2000

Source title: Journal of Applied Physics

Volume: 88

Issue: 8

Page : 4778-4782

Cited by: 5

Link: [Scopus Link](#)

Correspondence Address: Duc, N.H.; Cryogenic Laboratory, Faculty of Physics, National University of Hanoi, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam; email: duc@cryolab.edu.vn

ISSN: 218979

CODEN: JAPIA

Language of Original Document: English

Abbreviated Source Title: Journal of Applied Physics

Document Type: Article

Source: Scopus

Authors with affiliations:

1. Duc, N.H., Cryogenic Laboratory, Faculty of Physics, National University of Hanoi, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam
2. Fnidiki, A., Lab. de Magnet. et Applications, GPM-UMR 6634, Universit   de Rouen, 76821 Mont-Saint-Aignan, France
3. Teillet, J., Lab. de Magnet. et Applications, GPM-UMR 6634, Universit   de Rouen, 76821 Mont-Saint-Aignan, France
4. Ben Youssef, J., Groupe des Laboratoires de Bellevue, CNRS, 92195 Meudon Cedex, France
5. Le Gall, H., Groupe des Laboratoires de Bellevue, CNRS, 92195 Meudon Cedex, France

References:

1. Nevitt, M.V., Aldred, A.T., (1963) J. Appl. Phys., 34, p. 463
2. Aldred, A.T., (1976) Phys. Rev. B, 14, p. 219
3. Aldred, A.T., Rainford, B.D., Kouvel, J.S., Hicks, T.J., (1976) Phys. Rev. B, 14, p. 228
4. Shiga, M., Nakamura, N., (1980) J. Phys. Soc. Jpn., 49, p. 528
5. Dubiel, S.M., (1976) Acta Phys. Pol. A, 49, p. 619
6. Dubiel, S.M., Zukrowski, J., (1981) J. Magn. Magn. Mater., 23, p. 214
7. Hasegawa, H., Kanamori, J., (1972) J. Phys. Soc. Jpn., 33, p. 1607
8. Ebert, H., Winter, H., Jhonson, D.D., Pinski, F.J., (1990) J. Phys.: Condens. Matter, 2, p. 443
9. Li, Z., Luo, H., (1991) J. Phys.: Condens. Matter, 3, p. 9141
10. Bland, J.A.C., Heinrich, B., (1994) Ultrathin Magnetic Structure, 1. , Springer, Berlin
11. Zabel, H., (1999) J. Phys.: Condens. Matter, 11, p. 9303
12. Asada, T., Bihlmayer, G., Handshuh, H., Heinze, S., Kurz, P., Blögel, S., (1999) J. Phys.: Condens. Matter, 11, p. 9347
13. Sumiyama, K., Ohshima, N., Nakamura, Y., (1987) Trans. Jpn. Inst. Met., 28, p. 699
14. Gwiazda, J., Marianska, E., Oleniacz, J., Peryt, M., Zych, W., (1990) Hyperfine Interact., 55, p. 973
15. Xia, S.K., Baggio-Saitovitch, E., Larica, C., (1994) Phys. Rev., 49, p. 927
16. Shiga, M., Nakamura, N., (1976) J. Phys. Soc. Jpn., 40, p. 1295
17. Due, N.H., (1997) Handbook of the Physics and Chemistry of Rare Earths, 24, p. 339. , edited by K. A. Gschneidner and L. Eyring Elsevier Science, Amsterdam
18. Chikazumi, S., (1964) Physics of Magnetism, p. 73. , Wiley, New York
19. William, A.R., Moruzzi, V.L., Malozemoff, A.P., Terakura, K., (1983) IEEE Trans. Magn., 19, p. 1983
20. Gavigan, J.P., Givord, D., Li, H.S., Voiron, J., (1988) Physica, B149, p. 345