

The crystallization, magnetic and magnetocaloric properties in $\text{Fe}_{76.5-x}\text{Nb}_x\text{Si}_{15.5}\text{B}_7\text{Au}_1$ ribbons

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Abstract: $\text{Fe}_{76.5-x}\text{Nb}_x\text{Si}_{15.5}\text{B}_7\text{Au}_1$ ribbons ($x=0.0, 1.5, 3.0, 4.5$) have been fabricated by rapid quenching technique. The DSC measurements indicated that both first exothermal peak T_{p1} (of $\alpha\text{-Fe}(\text{Si})$ phase) and second peak T_{p2} (of boride phase) as well as crystallization activation energy increase with increasing Nb content substituted, whereas saturation magnetization of samples decreases with x , due to ferromagnetic dilution. Besides, Curie temperature of amorphous phase decreases with x , i.e. Nb stabilizes amorphous structure of ribbons. The investigation of magnetic entropy change of studied samples showed that it may lead to magnetocaloric effect around respective Curie temperature of amorphous phase. © 2006 Elsevier B.V. All rights reserved.

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References:

- Yoshizawa, Y., Oguma, S., Yamauchi, K., (1988) *J. Appl. Phys.*, 64, p. 6044
- Chau, N., Hoa, N.Q., Luong, N.H., (2005) *J. Magn. Magn. Mater.*, 290, p. 1547
- Chau, N., Hoa, N.Q., The, N.D., Vu, L.V., (2006) *J. Magn. Magn. Mater.*, 303, pp. e415
- Chau, N., Hoa, N.Q., The, N.D., Niem, P.Q., (2006) *J. Magn. Magn. Mater.*, 304, pp. e179
- Reza Yavari, A., Fish, G., Das, S.K., Davis, L.A., (1994) *Mater. Sci. Eng. A*, 181 -A182, p. 1415

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