

The crystallization in Finemet with Cu substituted by Ag

Chau N., Hoa N.Q., Luong N.H.

Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam

Abstract: The amorphous ribbon $\text{Fe}_{73.5}\text{Si}_{13.5}\text{B}_9\text{Nb}_3\text{Ag}_1$ has been prepared by rapid cooling on a single copper wheel. The DSC curves show the very sharp peak at 593-617 °C depending on the heating rate from 10 °C/min to 50 °C/min, which is higher than that for pure Finemet (540-572 °C, respectively). The crystallization activation energy of α -Fe(Si) phase has been determined and shown to be $E=4.09\text{eV}$, higher than that of pure Finemet ($E=3.25\text{eV}$). After annealing at 550 °C for 10 min, the crystallization volume fraction of α -Fe(Si) phase reaches the value of 78.4% with average grain size of 32 nm. The M(T) measurement along cooling cycle exhibits clearly two-step curve corresponding to the multiphase structure of the ribbon. The annealing of ribbon leads to the occurrence of nanocomposite state and improvement of soft magnetic properties of the material. © 2004 Elsevier B.V. All rights reserved.

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Correspondence Address: Chau, N.; Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam; email: chau@cms.edu.vn

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Authors with affiliations:

- Chau, N., Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam
- Hoa, N.Q., Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai, Thanh

Xuan, Hanoi, Viet Nam

- Luong, N.H., Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam

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