

Magnetic properties and magnetic viscosity of $\text{Pr}_4\text{Fe}_{76}\text{Co}_{10}\text{B}_6\text{Nb}_3\text{Cu}_1$ nanocomposite magnet

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Abstract: The nanocomposite magnet $\text{Pr}_4\text{Fe}_{76}\text{Co}_{10}\text{B}_6\text{Nb}_3\text{Cu}_1$ has been obtained by nanocrystallization of a rapidly-quenched amorphous flake. The influence of the annealing process on the structural and the magnetic properties are investigated. High magnetic hardness was reached with of large coercivity of $H_c = 3.65$ kOe, a remanent induction of $M_r = 12.0$ kG, $M_r/M_s = 0.79$ and maximum energy product $(BH)_{\max} = 17.6$ MGOe at optimal annealing conditions. The multiphase structures of Fe_3B as soft phases and of $\text{Pr}_2\text{Fe}_{14}\text{B}$ as hard phase were confirmed by X-ray diffraction data. The magnetic viscosity as a function of the reverse field was evaluated for all specimen. The results show that the magnetic viscosity coefficient peaks at a critical nucleation field, at which the magnetization reversal of the specimens becomes irreversible.

Author Keywords: Amorphous alloys; Magnetic aftereffect; Nanocomposite magnets; Permanent magnets

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