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Properties of amorphous FeCoB alloy particles (abstract)

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Amorphous and crystalline alloy particles ($0.05\text{--}0.5\ \mu\text{m}$) of $\text{Fe}_x\text{Co}_y\text{B}_z$ in which the ratio $y:x$ ranges from 0 to 0.1 have been prepared by the borohydride reduction of iron and cobalt salts in aqueous solution. The structure of the particles has been studied using Mössbauer spectroscopy and x-ray diffraction. Magnetic measurements of the saturation magnetization, coercivity, and remanence of the particles have been measured. The transition from the amorphous-to-crystalline state has been studied using differential scanning calorimetry (DSC) and thermomagnetometry up to a temperature of $450\ ^\circ\text{C}$ (see Fig. 1). It has been shown that the fraction of boron in the alloys (10–35 at. %) is dependent upon the rate of addition of salts to borohydride and the concentration of cobalt present; this in turn influences the crystallinity and magnetic properties.

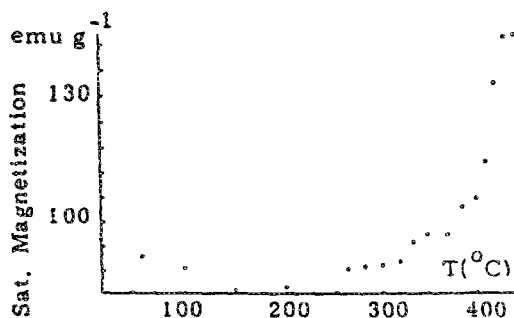


FIG. 1.