COMPLEX SUSCEPTIBILITY MEASUREMENTS IN AMORPHOUS GLASS-COATED MICROWIRES.

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Amorphous magnetic microwires are novel materials, which are characterized by unusual soft magnetic properties, such as magnetic bistability and GMI effect [1]. Since they are amorphous, the strongest anisotropy, which determines the character of the domain structure, is the magnetoelastic one. It is assumed that the domain structure of the microwires with positive magnetostriction consists of one large domain with axial magnetization surrounded by the outer domains with radially oriented magnetization. In that case, the magnetization process in axial direction runs in one large Barkhausen jump. The microwires with zero magnetostriction have complex domain structure. Magnetization process runs through the complex domain walls movement as well as magnetization rotation.

The measurement of the amplitude dependence of the complex AC susceptibility is useful method to study the magnetization process in magnetic material [2]. We have applied this method to study the magnetization processes in amorphous glass-coated microwires with positive, negative and vanishing magnetostriction. The features of the magnetization process (reversible domain wall movement, irreversible domain wall movement, reversible magnetization rotation or irreversible magnetization rotation) can be recognized from the shape of the amplitude dependence of complex AC susceptibility, which confirms the domain structures predicted in microwires with different magnetostriction constant. Moreover, such important information as the pinning field distribution (for the irreversible domain wall movement) and the anisotropy field distribution (for the irreversible magnetization rotation) were obtained from the complex AC susceptibility measurement.

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