

Surfactant effect of Bi on the interface structure of Fe/Cr(100) multilayers by sputter deposition

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About giant magnetoresistance (GMR) numerous observations have been reported, indicating that interface roughness plays an important role in the GMR effect. Recently, surfactant mediated growth was introduced as a method to promote the 2D growth, and successful results were reported. For example using molecular beam epitaxy (MBE) technique, Bi surfactant atoms induced 2D growth in the heteroepitaxial growth of Cr on Fe(100) and floated up to the surface during Cr growth [1]. Therefore surfactant technique is one of useful method to fabricate flat and abrupt interfaces in metallic multilayers and spin valves [2]. To obtain information about the correlation between interface structure and electrical property in metallic multilayers, we have fabricated Fe/Cr(100) multilayers with and without Bi as a surfactant by sputter deposition. We investigated the differences in the interface structures and the magnetotransport properties between surfactant-mediated multilayers and normal ones. From the observations of X-ray diffraction patterns and Auger electron spectroscopy (AES), we confirmed that the interface structures of Fe/Cr(100) multilayers with Bi are sharper than that of multilayers without Bi, which means that Bi operates as an effective surfactant. The magnetoresistance ratios of the multilayers prepared with Bi were larger than those of the multilayers without Bi.

[1] M. Kamiko *et al.*, to be published in *Jpn. J. Appl. Phys.*

[2] See, for example W. F. Egelhoff, Jr, *et al.*, *Phys. Rev. B* **65**, 094433 (2002).

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