HALL EFFECT IN BISMUTH THIN FILM

by

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ABSTRACT

Hall coefficient and Hall mobility in bismuth thin films are measured for various values of film thickness. The Hall mobility is found to be smaller than the values reported for bulk material. This is consistent with theoretical expectation that the resistivity of thin film specimen is larger than that of bulk material. The Hall coefficient changes sign from positive at smaller thickness to negative at larger thickness (about 1960 Å). The magnitude of the coefficients for films of all thickness lies between the two values for bulk material with the magnetic field pointing parallel or perpendicular to the principal axis of bismuth lattice as reported in the literatures. This and the changing of sign of the Hall coefficients are interpreted as due to the undetermined orientation of the crystallites in the film resulting from the manner of preparation of the films.

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Hall coefficient and Hall mobility in bismuth thin films are measured for various values of film thickness. The Hall mobility is found to be smaller than the values reported for bulk material. This is consistent with theoretical expectation that the resistivity of thin film specimen is larger than that of bulk material. The Hall coefficient changes sign from positive at smaller thickness to negative at larger thickness (about 1960 Å). The magnitude of the coefficients for films of all thickness lies between the two values for bulk material with the magnetic field pointing parallel or perpendicular to the principal axis of bismuth lattice as reported in the literatures. This and the changing of sign of the Hall coefficients are interpreted as due to the undetermined orientation of the crystallites in the film resulting from the manner of preparation of the films.

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