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Magneto-transport properties of Bismuth Thin Films Grown on Kapton

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Text

Bismuth (Bi) thin films with thickness of 50 nm were grown by magnetron sputtering on kapton flexible substrates, at temperatures of 20, 80, 120, 200 and 270 °C. Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM) measurements reveal a nano-granular structure, with a progressive change of grain morphology and texture for samples grown at different temperatures. Resistivity and magnetoresistance (MR) measurements were performed with a PPMS, between 2K and 300K. Systematic variations in angular dependence of MR and of weak- antilocalization (WAL) effect were observed as a function of Bi growth temperature. Analysis of grain size distributions are related to systematic changes observed on magneto-transport properties [1] of Bi films as a function of in-situ temperature of growth. A comparison of film morphology and MR effect observed on Bi films grown at the same conditions on [2] Si and kapton substrates, shows that growth on kapton allows a direct connection of MR effects to Bi nano-granular structure.

[1] Gerber A et al, Phys. Rev. Lett. 99, 027201 (2007).

[2] P Athanasopoulos, Th Speliotis and C Christides, Journal of Physics: Conf. Series 903 012037 (2017).

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