

ANNEALING EFFECT ON GIANT MAGNETORESISTANCE OF CoCu/Cu MULTILAYER FILMS

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ABSTRACT

The discovery of giant magnetoresistance (GMR) in multilayer and granular system has stimulated world wide research activities, due to its fundamental significance and potential application. Cu/Cu-Co multilayers were prepared by RF sputtering deposition technique. The as-deposited and annealed (300°C, 15 minutes) samples were characterised by X-ray diffraction and Atomic Force Microscope. The resistances were measured using a four-point probe method to calculate the GMR effect. The microstructure analysis shows that the formation of <111> FCC Cu texture is dominant and small grain size was formed. X-ray diffraction indicated that the reduction of the correlation length is caused by grain coarsening due to growth of crystallites and grain boundaries after heat treatment. The magnetoresistance of Cu/Cu-Co multilayer has been measured as a function of the stacking layers before and after annealing. The MR ratio increase after the annealing process is carried out, but the MR value change within a small range as the number of the stacking layers increase. This shows that the number of stacking layer doesn't affect the GMR value. The highest GMR value observed is for sample with five stacking layers where 0.61% for as-deposited sample and 0.92% for annealed sample.

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