

Magnetic phase transitions in epitaxial FeRhPd alloys films

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Abstract

The magnetic phase transitions of FeRhPd were studied in relation to the structural and morphological properties of epitaxial thin films. $\text{Fe}_{47}\text{Rh}_{47}\text{Pd}_6$ was epitaxial grown on MgO(100) at 400°C to 700°C by DC magnetron sputtering. The epitaxial growth of FeRhPd was studied in detail using X-ray diffraction. Pole figure analysis shows the crystallographic relation between FeRhPd and MgO substrate. For θ -2 θ scans, the reduction of the full width of half maximum of the out of plane diffraction peak intensity was observed as the growth temperature is increased from 400°C to 700°C. The lattice constants are also observed to change with respect to the growth temperature. The order parameter of FeRhPd, determined from the ratio of intensities of the superstructure (100) peak to the fundamental (200) peak was found to be nearly independent of growth temperature. For the magnetic phase transition, the phase transition width narrows and the transition temperature increases with increasing growth temperature.