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研究论文

电结晶制**Co/Pt**多层膜的结构及磁性研究

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摘要 以单晶Si(111)为基底, 在以P盐[主要成分$Pt(NO_2)_2(NH_3)_2$]和$CoSO_4$为主盐的硼酸体系中电结晶Co/Pt多层膜. SEM观察多层膜的断面形貌, 证实多层膜具有周期结构. 经XRD测试, 首次证实了Co-Pt界面上有$CoPt_3$化合物的存在. 用PPMS测试了多层膜的磁滞回线, 平行于外磁场时膜的矫顽力约为165 Oe, 垂直于外磁场时的矫顽力随Co含量的增加而增加, 最大达到396 Oe. 首次用电结晶方法制得了易磁化轴垂直于膜面的Co/Pt多层膜.

关键词 电化学结晶 多层膜 X射线衍射 磁滞回线 垂直磁各向异性

分类号

Structure and Magnetic Properties of Electrodeposited Co/Pt Multilayers

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Abstract The Co/Pt multilayers film was deposited on monocrystal Si(111) using electrocrystallization in boric acid system, in which $Pt(NO_2)_2(NH_3)_2$ and $CoSO_4$ were used as main salts. The cross section morphology of the multilayers was characterized by SEM method. The results showed that a periodically layered structure was obtained by electrodeposition. In Co/Pt interface, $CoPt_3$ was found by middle angle X-ray diffraction method. The hysteresis loop of the multilayers was determined by PPMS method. The result showed that the coercivity of multilayers was about 165 Oe parallelly, and the coercivity in perpendicular increased with the content of Co, 396 Oe at a maximun. The Co/Pt multilayer with the easy-magnetization axis perpendicular to the face of layers was firstly prepared by electrocrystallization method.

Key words electrocrystallization multilayer X-ray diffraction hysteresis loop perpendicular magnetic anisotropy

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