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研究论文

$Zn_{0.4}Ni_{0.6}Cr_{0.5}La_xFe_{1.5-x}O_4$铁氧体纳米粉晶的制备及磁性

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摘要 用柠檬酸盐前驱物-溶胶凝胶法制备了$Zn_{0.4}Ni_{0.6}Cr_{0.5}La_xFe_{1.5-x}O_4$ (x=0～0.10)纳米粉晶. 用DSC-TG分析了前驱物转变为粉晶的热分解过程, 通过粉末X射线衍射仪(XRD)、透射电子显微镜(TEM)和振动样品磁强计(VSM)等表征了产物的结构、形貌和磁性能. 结果表明, 不同温度和不同的La掺杂量对样品的晶粒尺寸、晶胞参数和形貌均产生了明显的影响, 且通过改变La含量能起到调控样品磁性能的作用.

关键词 溶胶-凝胶 纳米晶 Zn-Ni-Cr-铁氧体 镧掺杂 磁性能

分类号

Synthesis of Nanocrystalline Ferrites $Zn_{0.4}Ni_{0.6}Cr_{0.5}La_xFe_{1.5-x}O_4$ and Its Magnetic Properties

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Abstract The nanocrystalline ferrites $Zn_{0.4}Ni_{0.6}Cr_{0.5}La_xFe_{1.5-x}O_4$ (x=0～0.10) were prepared with citrate precursor by sol-gel process. The thermolysis process of translating citrate precursor into crystalline was analyzed by means of DSC-TG. The structure, morphology and magnetic properties of the obtained products were characterized by X-ray diffractometer (XRD), transmission electron microscopy (TEM) and vibrating sample magnetometer (VSM), respectively. The results show that the temperature and the content of doped La have an obvious effect on the crystallite sizes, lattice parameter and morphology of samples. The magnetic properties of the samples can be also tailored by varying the content of La.

Key words sol-gel nanocrystalline Zn-Ni-Cr-ferrite doped with La magnetic property

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