

Full Paper

聚苯胺/镧取代锂镍铁氧体纳米复合物的制备、表征及磁性

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摘要 在盐酸溶液中通过原位聚合法制备了磁性聚苯胺/镧取代锂镍铁氧体 ($\text{LiNi}_{0.5}\text{La}_{0.02}\text{Fe}_{1.98}\text{O}_4$) 纳米复合物。在外加磁场下纳米复合物表现出了磁滞现象, 其饱和磁化强度 (M_s) 和矫顽力 (H_c) 随铁氧体含量的改变而变化。用X-射线衍射 (XRD)、透射电子显微镜 (TEM)、扫描电子显微镜 (SEM)、红外光谱 (FT-IR)、紫外-可见光谱 (UV-Vis) 以及振动样品磁强计 (VSM) 等对纳米复合物进行了表征。TEM和SEM表明纳米复合物具有核-壳结构。XRD、FT-IR和UV-Vis光谱揭示了纳米复合物中铁氧体与聚苯胺之间存在着一定的键合作用, 并探讨了铁氧体与聚苯胺之间的键合机制。

关键词 [纳米复合物](#), [聚苯胺](#), [铁氧体](#), [磁学性质](#)

分类号

Preparation, Characterization and Magnetic Properties of PANI/La-substituted LiNi Ferrite Nanocomposites

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Abstract Magnetic nanocomposites containing polyaniline (PANI)-coated La-substituted LiNi ferrite ($\text{LiNi}_{0.5}\text{La}_{0.02}\text{Fe}_{1.98}\text{O}_4$) were synthesized by *in situ* polymerization in aqueous solution of hydrochloric acid. The nanocomposites exhibited the magnetic hysteresis nature under applied magnetic field. The saturation magnetization (M_s) and coercivity (H_c) varied with the ferrite content. The obtained nanocomposites were characterized by X-ray diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FT-IR), UV-Visible spectroscopy and vibrating sample magnetometer (VSM). TEM and SEM studies showed that the nanocomposites present the core-shell structure. The results of XRD patterns, FT-IR and UV-Visible spectra indicated the formation of PANI- $\text{LiNi}_{0.5}\text{La}_{0.02}\text{Fe}_{1.98}\text{O}_4$ nanocomposites and showed that the interaction existed between PANI backbone and ferrite particles in the nanocomposites. The bonding mechanism in the nanocomposites has been proposed.

Key words [nanocomposite](#) [polyaniline](#) [ferrite](#) [magnetic property](#)

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