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研究论文

镨掺杂钡铁氧体--聚吡咯复合膜的制备和性能

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摘要: 分别用溶胶-凝胶法和原位氧化聚合法制备了镨掺杂钡铁氧体/聚吡咯复合膜, 借助X射线衍射仪(XRD)、红外光谱(FTIR)、扫描电子显微镜(SEM)、振动样品磁强计(VSM)和矢量网络分析仪等手段表征了复合膜的结构和形貌, 研究了样品的磁性能和吸波性能。结果表明, 复合膜的饱和磁化强度Ms和剩余磁化强度Mr均比钡铁氧体单膜的低, 复合膜的矫顽力Hc比钡铁氧体膜的高; 镨掺杂钡铁氧体--聚吡咯复合膜兼具介电损耗和磁损耗, 有利于拓宽吸收频带和改善吸波性能。

关键词: 无机非金属材料 钡铁氧体 镨掺杂 聚吡咯 复合薄膜

Preparation and Properties of Pr Doped Ba Ferrite/Polypyrrole Composite Film

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Abstract: Pr-doped Ba ferrite composite film was prepared by a sol-gel method and an in situ polymerization method, respectively. The structure, morphologies, magnetic properties and microwave absorption properties of the samples were characterized using X-ray diffractometer (XRD), Fourier transform infrared spectrometer (FTIR), scanning electron microscope(SEM), vibrating sample magnetometer (VSM) and magnetic vector network analyzer. The results show that the saturation agnetization (Ms) and the remanent magnetization (Mr) of the composite film are lower than that of Ba Ferrite film, but the coercivity force (Hc) of the composite film is higher than that of Ba Ferrite film. Pr doped Ba ferrite/ polypyrrole composite film has both dielectric loss and magnetic loss, which is beneficial to widen microwave band and improve microwave absorption properties.

Keywords: inorganic non-metallic materials Ba-ferrite Pr-doped PPY composite film

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参考文献:

[1] PAN Lingling, WANG Yuping, LI Liangchao, LIU Wei, XU Feng, Preparation and magnetic properties of Ladoped Sr ferrite/polypyrrole composites, Acta Chimica Sinica, 66(13), 1559(2008)

[2] Haldorai Yuvaraj, Min Hee Woo, Eun Ju Park, Yeon Tae Jeong, Kwon Taek Lim,

Polypyrrole/γ-Fe2O3 magnetic nanocomposites synthesized in supercritical fluid, European Polymer Journal, 44, 637(2008)

[3] R.P.Tandon, M.R.Tripathy, A.K.Arora, Surat Hotchandani, Gas and humidity response of iron oxide—Polypyrrole nanocomposites, Sensors and Actuators B, 114, 768(2006)

[4] Nanda Gopal Sahoo, Yong Chae Jung, Hyang Hwa So, Jae Whan Cho, Polypyrrole coated carbon nanotubes: synthesis, characterization, and enhanced electrical properties, Synthetic Metals, 157, 374(2007)

[5] Cunrui Zhang, Qiaoling Li, Yun Ye, Preparation and characterization of polypyrrole/nano-SrFe12O19 composites by in situ polymerization method, Synthetic Metals, 159, 1008(2009)

[6] Jianxun Qiu , Lijuan Lan, Hong Zhang , Mingyuan Gu, Effect of titanium dioxide on microwave absorption properties of barium ferrite, Journal of Alloys and Compounds, 451, 261(2008)

[7] Zhongzhu Wang, Hong Bia, b, Jian Liu, Tao Sun, Xianliang Wu, Magnetic and microwave absorbing properties of polyaniline/γ-Fe2O3 nanocomposite, Journal of Magnetism and Magnetic Materials, 320, 2132(2008)

[8] Jing Jiang, Lun-Hong Ai, Da-Bin Qin, Hui Liu, Liang-Chao Li, Preparation and characterization of electromagnetic functionalized polyaniline/BaFe12O19 composites, Synthetic Metals, 159, 695(2009)

[9] Xin Tang, Yuanguang Yang, Surface modification of MBa-ferrite powders by polyaniline: Towards improving microwave electromagnetic response, Applied Surface Science, 255, 9381(2008)

[10] Min-Kyu Song, Young-Taek Kim, Bum-Seok Kim, Jinhwan Kim, Kookheon Char, Hee-Woo Rhee, Synthesis and characterization of soluble polypyrrole doped with alkylbenzenesulfonic

[11] acids, Synthetic Metals, 141, 315(2004)

[12] M.Bazzaoui, J.I.Martins, E.Machnikova, E.A.Bazzaoui, L.Martins, Polypyrrole films electrosynthesized on stainless steel grid from saccharinate apueous solution and its behaviour toward acetone vapor, Eurpean Polymer Jounal, 43, 1347(2007)

[13] A.Bhattacharya, K.M.Ganguly, A.De, S.Sarkar, A new conducting nanocomposite—PPy-zirconium(IV)oxide, Materials Research Bulletin, 31(5), 527(1996)

[14] F.Sauzedde, A.Elaissari, C.Pichot, Hydrophilic magnetic polymer latexes.1,Adsorption of magnetic iron oxide nanoparticles onto various cationic latexes, Colloid Polym Sci, 277(9), 846(1999)

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146
9. 何轶伦 周伍喜 李松林 刘怀菲 赖天苗 汤盛龙.La2O3 -Y2O3-ZrO2纳米陶瓷粉末制备及高温相稳定性[J]. 材料研究学报, 2011,25(1): 32-38
10. 钟月锋 万云涛 夏海平.Ni^{2+} 掺杂近化学计量比铌酸锂晶体的近红外发光特性[J]. 材料研究学报, 2011,25(1): 84-88
