

由Mg-Fe(II)-Fe(III)LDH层状前体制备MgFe₂O₄尖晶石的研究

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摘要 提出了一种由层状前体合成单一晶相镁铁尖晶石的新方法,首先对Mg-Fe(II)-Fe(III)水滑石的制备进行了系统研究,成功合成了Mg²⁺/Fe²⁺/Fe³⁺摩尔比分别为1/2/1, 4/5/3, 2/1/1的系列水滑石层状前体,结果表明在以上三种投料比下均可制备出晶型较好的水滑石层状前体,并探讨了合成条件对晶体结构的影响规律。在此基础上,利用X射线衍射、振动样品磁强计和穆斯堡尔谱等手段研究了层状前体焙烧产物的结构、组成、磁性及微观信息,研究表明当Mg²⁺/Fe²⁺/Fe³⁺投料摩尔比为2/1/1时,焙烧层状前体可得到晶相单一的尖晶石型铁氧体。

关键词 [尖晶石](#) [镁](#) [铁](#) [水滑石](#) [共沉淀](#) [磁性](#) [软磁材料](#) [焙烧](#) [X-射线衍射](#) [穆斯堡尔谱](#)

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Investigation of MgFe₂O₄ Spinel Prepared from Layered Magnesium- Iron(II)-Iron(III) Hydrotalcite Precursors

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Abstract The purpose of this work is to synthesize a single phase spinel from a layered magnesium-iron(II)-iron(III) hydrotalcite precursors. This paper reports a systematic investigation of the preparation of Mg-Fe(II)-Fe(III) hydrotalcites, and several hydrotalcites with different Mg²⁺/Fe²⁺/Fe³⁺ molar ratios in the layers were obtained. When the Mg²⁺/Fe²⁺/Fe³⁺ molar ratio in the stock solution is equal to 1/2/1, 4/5/3 or 2/1/1, a well crystallized hydrotalcites were obtained. The effects of various reaction conditions on the crystal structure were also investigated. The hydrotalcites were characterized by XRD, VSM and Mossbauer spectroscopy. When the Mg²⁺/Fe²⁺/Fe³⁺ molar ratio in the reaction mixture was 2/1/1, the material obtained by calcining the resulting hydrotalcite was a single phase spinel.

Key words [SPINEL](#) [MAGNESIUM](#) [IRON](#) [HYDROTALCITE](#) [COPRECIPITATION](#) [MAGNETISM](#) [SOFT MAGNETIC MATERIALS](#) [ROASTING](#) [X-RAY DIFFRACTION](#) [MOSSBAUER SPECTROSCOPY](#)

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