

## 研究论文

### Fe<sub>3</sub>O<sub>4</sub> 十八面体和十二面体的合成及磁性能

李万喜<sup>1,2</sup>, 吕宝亮<sup>1</sup>, 徐耀<sup>1</sup>, 吴东<sup>1</sup>

- 1.中国科学院山西煤炭化学研究所煤转化国家重点实验室 太原 030001
- 2.中国科学院研究生院 北京100049

**摘要:** 在水热合成 $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> 十八面体和十二面体的基础上, 以5% H<sub>2</sub>+95% N<sub>2</sub>为还原介质, 通过控制还原条件制备出纯相Fe<sub>3</sub>O<sub>4</sub> 十八面体和十二面体颗粒。用X射线衍射、扫描电镜、X射线光电子能谱、透射电镜和振动样品磁强计等手段对样品进行了表征。结果表明, 颗粒表面氟离子吸附层的存在是其形貌保持较好的重要原因。与其它形貌的Fe<sub>3</sub>O<sub>4</sub> 颗粒比较, 本文合成的多面体Fe<sub>3</sub>O<sub>4</sub> 颗粒矫顽力较高, 主要归因于吸附的氟离子层和材料的形貌结构。

**关键词:** 无机非金属材料 四氧化三铁 多面体 氟离子 磁性能

### Synthesis and Magnetic Properties of Dodecahedral and Octodecahedral Magnetite

LI Wanxi<sup>1,2</sup>, LV Baoliang<sup>1</sup>, XU Yao<sup>1</sup>, WU Dong<sup>1</sup>

- 1.State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan 030001
- 2.Graduate University of the Chinese Academy of Sciences, Beijing 100049

**Abstract:** Octodecahedral and dodecahedral magnetite (Fe<sub>3</sub>O<sub>4</sub>) particles were prepared by reducing hematite ( $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>) polyhedra in 5% H<sub>2</sub>+95% N<sub>2</sub> atmosphere. The samples were characterized by X-ray diffraction, scanning electron microscopy, X-ray photoelectron spectroscopy, transmission electron microscopy and vibrating sample magnetometer. The results show that the existence of fluorine adsorption layer on the surface of particles may be primary reason for holding the polyhedral morphology. Magnetic analysis shows that the obtained Fe<sub>3</sub>O<sub>4</sub> polyhedral particles possess higher coercivity than the Fe<sub>3</sub>O<sub>4</sub> particles reported by others, mainly due to the adsorbed fluorine and the morphology and structure of polyhedral particles.

**Keywords:** inorganic non-metallic materials Fe<sub>3</sub>O<sub>4</sub> polyhedra fluorine magnetic properties

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通讯作者: 徐耀

作者简介:

通讯作者E-mail: xuyao@sxicc.ac.cn

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