

研究论文

水热重结晶法制备四方相纳米 $Ba_{0.9}Ca_{0.1}TiO_3$ 晶体的研究

张维维, 沈志刚, 闫涛, 陈建峰*

(北京化工大学 纳米材料先进制备技术与应用科学教育部重点实验室 教育部超重力工程研究中心 北京 100029)

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摘要 采用水热重结晶法对低温液相法制备的 $Ba_{0.9}Ca_{0.1}TiO_3(B_{0.9}C_{0.1}T)$ 浆料进行220 °C, 3 h的水热处理, 成功制备了四方相 $B_{0.9}C_{0.1}T$ 纳米粉体. 并对水热重结晶和未水热处理的两种粉体进行了TEM, XRD, Raman, FT-IR, TG和介电性能表征. 研究表明,

经水热重结晶后的 $B_{0.9}C_{0.1}T$ 粉体体系发生从顺电立方相向铁电四方相的转变, 羟基缺陷以及 CO_3^{2-} 杂质显著减少, 粉体形貌由外边缘毛躁的球形转变为四边形. 并发现羟基缺陷的减少是影响体系相转变的关键因素.

关键词 [Ba_{0.9}Ca_{0.1}TiO₃](#)- [水热重结晶](#) [羟基缺陷](#)

分类号

Study on Hydrothermal Recrystallization Method for Synthesis of Tetragonally Structured $Ba_{0.9}Ca_{0.1}TiO_3$ Nanocrystals

ZHANG Wei-Wei, SHEN Zhi-Gang, YAN Tao, CHEN Jian-Feng*

(Key Laboratory for Nanomaterials, Research Center of the Ministry of Education of China for High Gravity Engineering and Technology, Beijing University of Chemical Technology, Beijing 100029)

Abstract A novel hydrothermal recrystallization route has been developed to produce tetragonal $Ba_{0.9}Ca_{0.1}TiO_3$ nanocrystals. The obtained powders were analyzed by TEM, XRD, Raman spectra, FTIR, TG and dielectric property measurements, and showed much less hydroxyl lattice defects, higher purity and better crystallinity than those prepared by low-temperature aqueous synthesis (LTAS) method. The hydroxyl lattice defect was key factor to influence the phase transition from paraelectric cubic to ferroelectric tetragonal structure.

Key words [Ba_{0.9}Ca_{0.1}TiO₃](#)- [hydrothermal recrystallization method](#) [hydroxyl lattice defect](#)

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通讯作者 陈建峰 chenjf@mail.buct.edu.cn

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