

低温燃烧合成法制备 $Ce_{0.8}Y_{0.2}O_{1.9}$ 纳米粉体

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摘要 采用柠檬酸做还原剂, 硝酸盐做氧化剂, 利用溶胶-凝胶低温燃烧合成工艺制备了纳米晶 $Ce_{0.8}Y_{0.2}O_{1.9}$ 固溶体. 用TG/DTA、XRD、FTIR、Raman和TEM等检测手段研究了柠檬酸用量、前驱体溶液的pH值、氧化剂的用量等工艺参数对凝胶的形成、分解及产物特性的影响. 结果表明, 通过控制柠檬酸的用量、溶液的pH值, 可以获得稳定的凝胶. 改变氧化剂的用量, 可以获得颗粒尺寸在5~40nm范围的超细粉体. Raman研究表明, 随氧化剂含量的增加, 氧空位浓度增大.

关键词 [纳米固溶体](#) [燃烧合成](#) [Ce0.8Y0.2O1.9](#) [拉曼光谱](#)

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Nano-scale $Ce_{0.8}Y_{0.2}O_{1.9}$ Powders Prepared by Low Temperature Combustion Synthesis Technique

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Abstract Nanocrystalline $Ce_{0.8}Y_{0.2}O_{1.9}$ solid solution was synthesized by a gel combustion technique using citric acid as reductant and nitrates as oxidants. The effects of processing parameters, such as the amount of citric acid, the pH value of solution, the amount of oxidants on the gel formation and the powders characteristics of the product were investigated by using TG/DTA, XRD, FTIR, Raman and TEM. The stable gel was obtained by controlling the amount of citric acid and the pH value.

The nanocrystalline $Ce_{0.8}Y_{0.2}O_{1.9}$ powders in the range of 5nm to 40nm were obtained by changing the amount of oxidants. The Raman investigation showed that the oxygen vacancy concentration increased with the increase of the amount of oxidants.

Key words [nanosized solid solution](#) [combustion synthesis](#) [Ce0.8Y0.2O1.9](#) [Raman spectroscopy](#)

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