URN etd-0407109-183716-1301
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Statistics This thesis had been viewed 69 times. Download 0 times.
Department
Year 2007
Semester 2
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title Preparation of Eu activated strontium silicate phosphor by a sol-gel method and its luminescent properties
Date of Defense 0000-00-00
Page Count 67
Keyword
phosphor
strontium silicate
sol–gel method

Abstract
In this study, Eu2+-activated Sr2SiO4 phosphor was successfully synthesized by a sol–gel method using sodium silicate and SrO as the starting materials. The emission band and the emission intensity of the phosphor powders were influenced by the pre-treating temperature. The maximum emission intensity of the phosphor was found as pre-treated at 1200 ℃ in air and re-heated at 1300 ℃ in the reducing atmosphere (10%H2 + 90% He). As the pre-treating temperature was < 1200 ℃, the composition of the phosphor powder was not uniform, which leads to decrease of the emission intensity, whereas >1200 ℃, the decrease of the emission intensity may be caused from the reversible phase transformation of Sr3SiO5 → Sr2SiO4 at 1300 ℃, which also shows the red-shift behavior.
Moreover, the luminescent properties of strontium orthosilicate phosphor was affected by Sr/Si ratio. The emission band was shifted to longer wavelength by increasing Sr/Si ratio. In the study of thermal fluctuation, the decrease the high temperature emission intensity of the long wavelength peak is higher than the short wavelength peak. It is caused from the Eu2+ in the low restrictive structure of Sr2+(II). In addition, as the reducing temperature increases, the color shifts to white light range in the configuration coordinate diagram.
Advisory Committee Ming-Shyong Tsai - advisor

Files No Any Full Text File.
Date of Submission 2008-07-03