

Preparation and Luminescence Characteristics of $M_3SiO_5:Eu^{2+}$ Phosphor by Spray Pyrolysis

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Silicate phosphor is known as an excellent luminescence under excitation of near-ultraviolet (NUV) or blue light. In this work, Eu^{2+} -doped M_3SiO_5 ($M=Ba, Sr$) phosphor particles were prepared by spray pyrolysis and their luminescent properties were investigated with changing the Eu^{2+} content, reducing temperature, and Ba/Sr ratio. In the case of $Sr_3SiO_5:Eu^{2+}$ phosphor, the prepared particles had the crystal phase of not pure Sr_3SiO_5 but Sr_2SiO_5 , irrespective of the reduction temperature. As a result, the nm emission peak was observed at 542 ~ 552 nm for all $Sr_3SiO_5:Eu^{2+}$ samples. In the case of $Ba_3SiO_5:Eu^{2+}$ phosphor, the major phase was Ba_3SiO_5 when the reduction temperature was over 1150 oC and Ba_2SiO_4 phase was formed as a minor phase. As a result, the two emissions at ca. 509 and 580 nm appeared. The 580 nm emission became dominant over 1300 oC. For the case of $(Sr/Ba)_3SiO_5:Eu^{2+}$ phosphor, three characteristic peaks for Ba_2SiO_4 , Sr_2SiO_4 , and Ba_3SiO_5 were observed, depending on the Sr/Ba ratio. All prepared phosphor showed a good excitation property in the wavelength range from 375 to 480 nm, which means that the $M_3SiO_5:Eu^{2+}$ could successfully work under the excitation of blue LED.