Luminescence characteristics of TiO_2: Eu particles prepared by spray pyrolysis

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Phosphors have gained large attention as the basic materials in various research areas such as displays, optical lasers, fluorescent sensing, bio-medical imaging, security ink, etc. The optical properties of phosphors strongly depend on host or activator materials. Titania is known as a good host for luminescent materials because of its good thermal and chemical stability as well as its high transparency in the visible wavelength region. In this work, Eu3+ -doped TiO2 powders were prepared by spray pyrolysis. The luminescence properties were investigated by varying the Eu concentration and the calcination temperature. Since trivalent Eu3+ ions should be inserted into Ti4+ sites, there exists charge imbalance. Thus, monovalent metals (M+ = Li+, Na+, K+) were codoped with Eu3+ in order to improve the emission properties. As a result, we found that Li+ is best for achieving the high luminescence.
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