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Energy transfer from Ce³⁺ to Tb³⁺ in low quartz and amorphous SiO₂ hosts

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Abstract content
   (Max 300 words)

Low quartz and amorphous Ce³⁺-Tb³⁺ co-activated SiO₂ phosphors were synthesized by a solution combustion using urea as a fuel. The objective of this study was to compare the efficiency of energy transfer form Ce³⁺ to Tb³⁺ in low quartz and amorphous SiO₂ hosts. The phosphors were annealed in a reducing atmosphere of 4%H2/96% Ar mixture at an elevated temperature of 1000 deg;C for 2 hours. This was meant to reduce incidental presence of Ce⁴⁺ (non-luminescent) to a fully homogeneous distribution of Ce³⁺ ions in silica matrix. As confirmed by X-ray diffraction (XRD) data, SiO₂ was produced as either low quartz or amorphous phase. The photoluminescence (PL) data showed that green emission of Tb³⁺ at 543 nm was sensitized by Ce³⁺, i.e. there was energy transfer from Ce³⁺ to Tb³⁺ resulting in an improvement of the green line emission due to the 5D4⟶7F5 transitions of Tb³⁺ ions. Possible mechanism of UV down-converted green emission due to energy transfer from Ce³⁺ to Tb³⁺ is discussed.

Apply to be
 consider for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

PhD

Main supervisor (name and email)
and his / her institution

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Would you like to
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Yes

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