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Energy transfer from Ce^{3+} to Tb^{3+} in low quartz and amorphous SiO_2 hosts

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Abstract content (Max 300 words)

Low quartz and amorphous Ce^{3+} - Tb^{3+} co-activated SiO_2 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 from Ce^{3+} to Tb^{3+} in low quartz and amorphous SiO_2 hosts. The phosphors were annealed in a reducing atmosphere of 4% H_2 /96% Ar mixture at an elevated temperature of 1000 deg:C for 2 hours. This was meant to reduce incidental presence of Ce^{4+} (non-luminescent) to a fully homogeneous distribution of Ce^{3+} ions in silica matrix. As confirmed by X-ray diffraction (XRD) data, SiO_2 was produced as either low quartz or amorphous phase. The photoluminescence (PL) data showed that green emission of Tb^{3+} at 543 nm was sensitized by Ce^{3+} , i.e. there was energy transfer from Ce^{3+} to Tb^{3+} resulting in an improvement of the green line emission due to the $5D_4 \rightarrow 7F_5$ transitions of Tb^{3+} ions. Possible mechanism of UV down-converted green emission due to energy transfer from Ce^{3+} to Tb^{3+} is discussed.

Apply to be considered 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 submit a short paper for the Conference Proceedings (Yes / No)?

Yes

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