

Crystal field effect on luminescent characteristics of Europium doped orthovanadate nanoparticles

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Abstract

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The Eu^{3+} impurity ions form two types of luminescent centres in the $\text{La}_{1-x}\text{Eu}_x\text{VO}_4$ powder samples. Crystal field calculations and analysis of crystal field parameters have shown that for the both types of centres the Eu^{3+} ions are under effect of the different, regular and defect, oxygen surrounding. The latter centres arise on surfaces of the particles. Increase of luminescence intensity for the samples obtained by different methods takes place in the noted order: solid state \rightarrow co-precipitation \rightarrow sol gel synthesis and correlates with decreasing of the particles sizes. Correlations between grain sizes and luminescence behavior of the $\text{La}_{1-x}\text{Eu}_x\text{VO}_4$ powders were studied.

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