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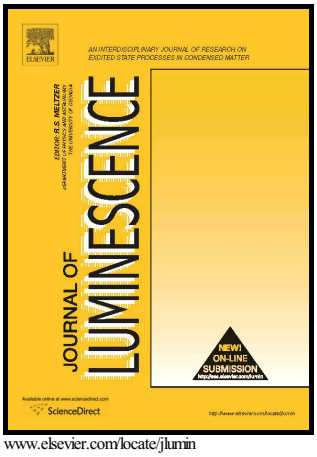

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Bandgap engineering of the $Lu_xY_{1-x}PO_4$ mixed crystals

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Abstract

Bandgap modification of the $Lu_xY_{1-x}PO_4$ mixed crystals has been studied by thermostimulated luminescence (TSL) and ab-initio calculation methods. Doping of $Lu_xY_{1-x}PO_4$ with Ce^{3+} allowed to follow up the changes of electron traps depth, caused by the modification of the bottom of conduction band. The observed gradual shift of the most intensive TSL peaks to higher temperatures with increase of **x** value was connected with the high-energy shift of the conduction band bottom. According to the band structure calculations the bottom of the conduction band is formed by the 5d and 4d states of Lu and Y, respectively. Therefore, substitution of one cation by another is responsible for the observed variation of the electronic and optical properties. Doping with Eu^{3+} was used to study the