VUV spectroscopy of double phosphates doped with rare earth ions.

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Structure and optical properties of Eu^{3+} and Gd^{3+} in sodium double phosphates were studied. Emission spectra were measured under VUV/UV excitation at room and low temperatures. Structural differences in various kinds of sodium double phosphate matrices are manifested in their optical behaviors. Under synchrotron radiation, $Na_3Gd(PO_4)_2$ exhibits the ultraviolet $^6P_J \rightarrow {}^8S_{7/2}$ and red from the ^6G_J level emissions. In the case of europium and gadolinium systems, the $Gd^{3+} \rightarrow Eu^{3+}$ energy transfer process was observed and investigated. Absence of emission from the ^5D_J and ^6I_J levels of the Gd^{3+} ion and from higher ^5D_J states of Eu^{3+} ion was attributed to the effective multiphonon relaxation which involves only two high-energy phonons of the phosphate group in this lattice.

Słowa kluczowe

Eu3+ ions, Gd3+ ions, double phosphate, cascade emission, energy transfer

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