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Vacuum-ultraviolet interconfigurational $4f^3 \rightarrow 4f 25d$ absorption and emission studies of the Nd^{3+} ion in KYF, YF, and YLF crystal hosts

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Abstract

The laser-induced vacuum-ultraviolet fluorescence spectra of KY 3F10: Nd^{3+} (KYF:Nd) and YF3: Nd^{3+} (YF:Nd) single crystals pumped by a pulsed-discharge molecular F2 laser at 157 nm were obtained. A number of new fluorescence peaks were observed and were assigned to the $4f 25d \rightarrow 4f^3$ dipole-allowed transitions of the Nd^{3+} ion. The absorption spectra of LiYF4: Nd^{3+} (YLF:Nd), KYF:Nd, and YF:Nd crystal samples in the vacuumultraviolet spectral regions were also obtained. Finally, the splitting of the states of the $4f25d$ configuration of the Nd^{3+} ion, which is due to the crystal field, was observed in all the crystal samples. © 1995 Optical Society of America.

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