

# Crystal growth, spectroscopic characterization and laser performance of Yb-doped lead fluoride crystals

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## Abstract:

Lead fluoride crystals doped with YbF<sub>3</sub>, NaF or KF- codoped were grown using the vertical Bridgman method. Room-temperature absorption, photoluminescence spectra, fluorescence lifetimes and laser performance belonging to the transitions between ground state <sup>2</sup>F<sub>7/2</sub> and the excited state <sup>2</sup>F<sub>5/2</sub> of Yb<sup>3+</sup> ions in these crystals have been investigated. Influence of the codoping with Na<sup>+</sup> and K<sup>+</sup> ions on the distribution coefficients, X-ray photoelectron spectrometry, absorption spectra and emission spectra of the Yb ions has been studied. With a 2 mol% Yb<sup>3+</sup> and Na<sup>+</sup>-codoped sample we obtained 2.65 W output power at 1045 nm for 7.5 W of incident power at 976 nm. The laser wavelength could be tuned from 1017 to 1078 nm, showing the great potential of Yb, Na: PbF<sub>2</sub> as an amplifier medium for femtosecond pulses.

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