

Using Rutherford Backscattering Spectroscopy to Investigate ErF₃ Doped CaF₂ Samples

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Using the vertical Bridgman method, we grow ErF₃ doped calcium fluoride (CaF₂) crystals with various concentrations. These samples are investigated using the Rutherford backscattering spectroscopy (RBS) method, which determines the depth profile of Ca, F, and Er (Fig. 1). The obtained results allow us to identify the correlated changes in the concentration of element of the crystals as Er³⁺ ions are doping. In addition, we build several trial models using the SIMNRA computer code to simulate the RBS spectra of all the investigated samples with different incident angle. Because the simulated spectra agree well with the experimental spectra, we can use these models to determine the depth profile of elements obtained directly from the RBS experiment spectra, the homogeneity of samples, and the possibility of layer porosity in ErF₃ doped CaF₂ crystals, where the concentration of Er may also play an important part (Fig. 2).

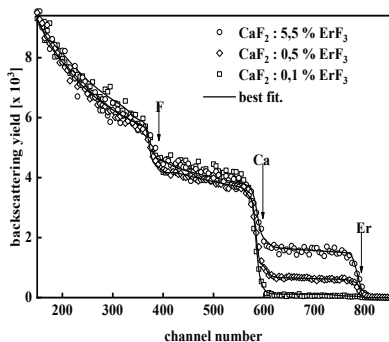


Fig. 1

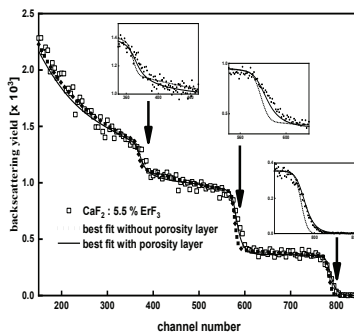


Fig. 2

Keywords: calcium fluoride; RBS; ErF₃; depth profile; porosity

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