

Synthesis and Purification of KY_3F_{10}

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The development of lasers in the blue region revived the interest in fluoride crystals. Due to its physico-chemical characteristics this compound can be utilized as a blue laser medium when doped with Thulium ions. In this work, a study of the best experimental conditions for the synthesis and purification of KY_3F_{10} will be presented. In the compound synthesis, a stoichiometric composition of KF (25 mol%) and YF_3 (75 mol%) was melted in a platinum boat, which was inserted in a platinum reactor. The rare earth fluoride was obtained by the hydrofluorination method from a high purity commercial oxide (99.99%, Aldrich). The hydrofluorination consists of a liquid-solid reaction between the Y_2O_3 and HF gas at 800°C. The water resulted from this reactions is eliminated by the flux composed by Argon and HF gases. KF commercial powder of 99% (Merck) purity was utilized. The synthesized material was semi transparent and composed of well-formed KY_3F_{10} grains. The purification will be performed using the zone refining technique with a hot zone translation rate of 5mm/h, under a HF+Ar flux to prevent contamination by oxygen and moisture. The characterization of the materials will be carried out by differential thermal analysis, X-ray powder diffraction and scanning electron microscopy.