

**SYNTHESIS OF GdF<sub>3</sub> FROM HIGH PURITY Gd<sub>2</sub>O<sub>3</sub> BY HYDROFLUORINATION.**

I.M. Ranieri, S.P. Morato and S.L. Baldochi

*Centro de Lasers e Aplicações-CLA, IPEN, Travessa R 400, C P 11049, Butantã, 05422-970 São Paulo, Brasil*

High purity fluorides (4N or better) are used to the Czochralki growth of rare earth tetrafluorides crystals (LiREF<sub>4</sub>), for optical applications. In our laboratory, rare earth fluorides have been synthesized from the corresponding 4N- oxide using a method named hydrofluorination [1]. In this method the oxide is placed in a platinum boat and heated under a flux of hydrofluoric acid and argon, until the substitution O/H takes place. Nevertheless the growth of the LiGdF<sub>4</sub> crystals some problems occurred regarding the presence of a thick carbon film floating in the liquid surface. This scum interferes in the process making the crystal growth very difficult. Efforts to eliminate the carbon complexes of the Gd<sub>2</sub>O<sub>3</sub>, by calcination on air or oxygen at temperatures up to 1,100 °C/ 14 hrs, were unfruitful. The sintered fluoride presented always a brown to black layer in the surface of the ingot. This work demonstrates that for the synthesis of high quality fluorides by hydrofluorination, not only the purity in relation to the rare earth must to be considered, but also the organic matter present in the precursor chemical.

I.G. Guggenheim, J. Appl. Phys. 34 (1963) 2482.