

## Synthesis & structural characterization of Yttrium calcium borate, compound, by one step solid- state reaction method

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**Abstract:** Yttrium calcium borate  $Y_2CaB_{10}O_{19}$  (YCB) compound is a new member of Rare Earth Borate compounds with nonlinear optical application. In the present research, the synthesis of YCB compound was investigated by using solid-state reaction method. Instead of usual preliminary and secondary thermal treatments, a single stage thermal process was developed. This new method is particularly important in terms of reducing the time and cost of synthesis. The structure of produced powder was analyzed by X-Ray diffraction and the powder x-ray data were also investigated by FullProf program. This Rietveld analysis confirmed the Hexagonal structure and  $P6_3/m$  space group, The bond angles were also reported. The anionic group and bond formation were studied using Raman spectroscopy. The results confirm both  $BO_3$  and  $BO_4$  formation. The Field emission scanning electron microscopy was carried out to study the morphology of the optimum sample.

**Keywords:** Rare Earth Borate compound;  $R_2CaB_{10}O_{19}$  ( $R$ =Rare earth) compound; Yttrium calcium borate  $Y_2CaB_{10}O_{19}$  (YCB) compound; solid-state reaction; X-ray diffraction; Raman spectroscopy.

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