

## **A New Approach on the Synthesis of Zinc Borates by Ultrasonic Method and Determination of the Zinc Oxide and Boric Acid Optimum Molar Ratio**

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**Abstract :** Zinc borates are used as a multi-functional flame retardant additive for its high dehydration temperature. In this study, a new method of ultrasonic mixing was used in the synthesis of zinc borates. The reactants of zinc oxide (ZnO) and boric acid (H<sub>3</sub>BO<sub>3</sub>) were used at the constant reaction parameters of 90°C reaction temperature and 55 min of reaction time. Several molar ratios of ZnO:H<sub>3</sub>BO<sub>3</sub> (1:1, 1:2, 1:3, 1:4, and 1:5) were conducted for the determination of the optimum reaction ratio. Prior to the synthesis, the characterization of the synthesized zinc borates were made by X-Ray Diffraction (XRD) and Fourier Transform Infrared Spectroscopy (FT-IR). From the results Zinc Oxide Borate Hydrate [Zn<sub>3</sub>B<sub>6</sub>O<sub>12</sub>.3.5H<sub>2</sub>O], were synthesized optimum at the molar ratio of 1:3, with a reaction efficiency of 95.2%.

**Keywords :** zinc borates, ultrasonic mixing, XRD, FT-IR, reaction efficiency

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