

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 (H₃BO₃) were used at the constant reaction parameters of 90°C reaction temperature and 55 min of reaction time. Several molar ratios of ZnO:H₃BO₃ (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 [Zn₃B₆O₁₂·3.5H₂O], 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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