

The Determination of the Zinc Sulfate, Sodium Hydroxide and Boric Acid Molar Ratio on the Production of Zinc Borates

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Abstract : Zinc borate is an important boron compound that can be used as multi-functional flame retardant additive due to its high dehydration temperature property. In this study, the raw materials of $ZnSO_4 \cdot 7H_2O$, NaOH and H_3BO_3 were characterized by X-Ray Diffraction (XRD) and Fourier Transform Infrared Spectroscopy (FT-IR) and used in the synthesis of zinc borates. The synthesis parameters were set to 100°C reaction temperature and 120 minutes of reaction time, with different molar ratio of starting materials ($ZnSO_4 \cdot 7H_2O:NaOH:H_3BO_3$). After the zinc borate synthesis, the identifications of the products were conducted by XRD and FT-IR. As a result, Zinc Oxide Borate Hydrate [$Zn_3B_6O_{12} \cdot 3.5H_2O$], were synthesized at the molar ratios of 1:1:3, 1:1:4, 1:2:5 and 1:2:6. Among these ratios 1:2:6 had the best results.

Keywords : Zinc borate, $ZnSO_4 \cdot 7H_2O$, NaOH, H_3BO_3 , XRD, FT-IR

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