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The Optimization of Copper Sulfate and Tincalconite Molar Ratios on the Hydrothermal Synthesis of Copper Borates

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Abstract : In this research, copper borates are synthesized by the reaction of copper sulfate pentahydrate (CuSO4.5H2O) and tincalconite (Na2O4B7.10H2O). The experimental parameters are selected as 80°C reaction temperature and 60 of reaction time. The effect of mole ratio of CuSO4.5H2O to Na2O4B7.5H2O is studied. For the identification analyses X-Ray Diffraction (XRD) and Fourier Transform Infrared Spectroscopy (FT-IR) techniques are used. At the end of the experiments, synthesized copper borate is matched with the powder diffraction file of “00-001-0472” [Cu(BO2)2] and characteristic vibrations between B and O atoms are seen. The proper crystals are obtained at the mole ratio of 3:1. This study showed that simplified synthesis process is suitable for the production of copper borate minerals.

Keywords : hydrothermal synthesis, copper borates, copper sulfate, tincalconite
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