

## Synthesis of Magnesium Borates from the Slurries of Magnesium Wastes by Microwave Energy

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**Abstract :** In this research, it is aimed not only microwave synthesis of magnesium borates but also evaluation of magnesium wastes. Synthesis process can be described with the reaction of Mg wastes and boric acid using microwave energy. X-Ray Diffraction (XRD) and Fourier Transform Infrared Spectroscopy (FT-IR) were applied to synthesized minerals. According to XRD results, magnesium borate hydrate mixtures were obtained as mcallisterite (pdf# = 01-070-1902,  $Mg_2(B_6O_7(OH)_6)_2 \cdot 9(H_2O)$ ) at higher crystallinity properties was achieved at the mole ratio raw material 1:1. Also, other kinds of magnesium borate hydrates were obtained at lower crystallinity such as admontite (pdf # = 01-076-0540,  $MgO(B_2O_3)_3 \cdot 7(H_2O)$ ), inderite (pdf # = 01-072-2308,  $2MgO \cdot 3B_2O_3 \cdot 15(H_2O)$ ) and magnesium borate hydrates (pdf # = 01-076-0539,  $MgO(B_2O_3)_3 \cdot 6(H_2O)$ ). FT-IR spectrums indicated that minor changes were seen at the band values of characteristic stretching in each experiment. At the end of experiments it is seen that using microwave energy may contribute positive effects to design of synthesis process such as reducing reaction time and products at higher crystallinity.

**Keywords :** magnesium wastes, boric acid, magnesium borate, microwave energy

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