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DEHYDRATION OF COLEMANITE IN MICROWAVE HEATED FLUID BED REACTOR

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On of the established application in anorganic chemistry is a solid-state reaction by microwave heating. Solids are agitated by the fluid passing through the bed by fluidization and the mixing of the solids ensures that there are no temperature gradients in the bed. The violent motion of the solids gives high heat transfer rates. In this study, dehydration of colemanite in a microwave heated fluid bed reactor was investigated. Dehydration of hydrated boron minerals is important in the production of boron compounds.

The experimental microwave apparatus (Elta Ltd., Bursa, Turkey) consists of a microwave generator at 2450 MHz, with adjustable power within the range 0-1 Kw, a magnetron, a R26 standard rectangular waveguide switch and an applicator. Applicator is a closed space. The flask is inserted into the applicator. The flask to be exposed to the microwave energy in the applicator is placed a position where the field intensity is maximum. In the experiments, single mode applicator was used. Three manually adjustable stub tuners inserted in the waveguide section. An optical fiber connected with a transducer (PT-100) allows the measurement of temperature inside the reactor with accuracy ± 1 ^{o}C. Forward and reflected powers and the temperature inside the reactor are recorded and monitored by using a programmable controller CSC μscada control programme. The fluidized bed column was constructed glass pipe, diameter 80 mm and height 182 mm. The different colemanite particle size and different MW power was used. The dehydration rate increases with increasing microwave power and decreasing particle size.