CHARACTERIZATION AND DETERMINATION OF GYPSUM HEMIHYDRATE IN PLASTERS BY THERMAL GRAVIMETRY ANALYSIS AND X-RAY FLOURESCENCE SPECTROSCOPY

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Calcium sulphate hemihydrate commonly known as plaster of Paris is extensively use in buildings, ceramics and medical. Hydration of hemihydrate is highly exothermic reaction. Surgically, implementation of bandage to the broken part of the body is an important stage of the process. This part of the process is affected seriously from gypsum properties on the bandage, especially hydrate type. Calcium sulfate involves 3 types of hydrate in the crystal structure; one of them is anhydrate which refers to no water molecule in the crystalline structure. The other one is dihydrate which refers to two water molecules in crystalline structure. And the last one is hemihydrate which refers to \( \frac{1}{2} \) water molecule in the structure. Hemihydrate calcium sulfate is useful for surgical purpose called plaster of Paris [1, 5]. Characterization of gypsum provides very useful information. We developed an analytical test method for characterization of gypsins. This test method includes FT-IR, TGA and XRF analysis and evaluation of tests data. In this study, the elemental analysis of gypsum was determined by EDXRF and the hydrate type was determined by Thermal Gravimetric Analyzer (TGA) due to the different thermal properties of it and FT-IR from bonding nature of water molecules [2,3]. Hydrate content of the gypsum was calculated from gypsum molecule formula [4].

References

1. ASTM F 2224:03 Standard Specification for High Purity Calcium Sulfate Hemihydrate or Dihydrate for Surgical Implants