REGENERATION OF PLASTER OF PARIS FROM USED MOULDS IN THE CERAMIC INDUSTRY

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Plaster of Paris ($CaSO_4\frac{1}{2}H_2O$) is widely used in the field of Ceramic Technology. Sri Lankas' requirements of this material are imported and used in the fabrication of various moulds for sanitaryware and crockery. It is customary, that once the Plaster has been used for the fabrication of moulds, it has to be discarded after a period of time. The present investigation using x-ray diffraction method (XRD) Simultaneous Thermal Analysis(STA) and Scanning Electron Microscopy (SEM) has revealed that the discarded gypsum in moulds could be re-used in industry. When water is added to Plaster of Paris for mould making, gypsum ($CaSO_4.2H_2O$) is formed. The material in the mould (gypsum) when heat treated is converted to Plaster of Paris. When this Plaster of Paris is used in mould making it shows a high water demand than usual, resulting in very weak open moulds, having low mechanical strength. The gypsum in the mould is also devoid of perfect crystal form and interlocking structure which imparts strength to the mould. The Plaster of Paris so formed does not approach its original composition.

Investigations under the Scanning Electron Microscope have revealed that the problem of regenerating Plaster of Paris is mainly connected to its crystal form. In order to modify the crystal habit of the Plaster of Paris attempts have been made to alter the gypsum crystal form in used moulds. To achieve this, moulds were first dehydrated to the anhydrate form ($CaSO_4$). Recrystalized gypsum with well developed crystals was obtained by immersing fully the above anhydrite in water for about 2 to 3 days. The recrystalized gypsum was dried, ground, sieved and heat treated to obtain Plaster of Paris. The Plaster of Paris obtained in this manner approached the composition of the original material which could be re-used for mould making.