

STUDIES ON THE CONVERSION OF DISCARDED MOULDS
TO PLASTER OF PARIS

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In Sri Lanka Plaster of Paris is used mainly in the ceramic industry for making moulds and they are discarded after a certain period. In the present study, investigations have been made to develop a simple method to convert discarded moulds to Plaster of Paris for the purpose of recycling.

Thermal analysis (DTA, TG and DTG), power X-ray diffraction, chemical analysis and estimation of breaking strengths have been made on discarded moulds, Plaster of Paris, and the products obtained after firing powdered moulds under different conditions.

Monoclinic form of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ has been identified in the used moulds while Plaster of Paris contains β - $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$. Higher heating rates are required for the formation of β - $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$ which gives rise to soluble anhydrite at about 170°C . At lower heating rates stable α -form is formed. Soluble anhydrite is transformed into an inactive form above 350°C . As such, a temperature lower than 350°C and a rapid heating rate are required for the conversion. Good quality Plaster of Paris could be produced by heating used moulds in the powdered form at 180°C for 2 hours in an open atmosphere. Physical and chemical properties of the product thus obtained conform to the standard requirements of commercial Plaster of Paris.