STUDY ON THE FEASIBILITY OF THE MANUFACTURE OF GYPSUM FROM DOLOMITE

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Dolomite ($CaCO_3.MgCO_3$) is a common mineral found in Sri Lanka especially in Kandy and Matale districts. There is now an increased utilization of dolomite as a building material.[1] This study was on the preparation of Gypsum ($CaSO_4.2H_2O$) which is an important constituent in the cement industry, using dolomite as the starting material. Sulphuric acid digestion of dolomite leads to a mixture of calcium sulphate and magnesium sulphate. The factors which affect the solubility of a precipitate were optimized so as to precipitate calcium sulphate preferentially over magnesium sulphate.

The study of the effect of temperature on the solubility of pure calcium sulphate at constant pH and the effect of pH at constant temperature revealed that calcium sulphate possesses lowest solubility at 333K in the pH range 3 - 5. Further studies of the effect of pH on the solubility using an equimolar mixture of calcium sulphate and magnesium sulphate revealed that the optimum pH is is 3.2 at 333k. The effect of ionic strength on the solubility was studied using an equimolar mixture of calcium carbonate and magnesium carbonate kept under the optimum condition using sulphuric acid. Sodium chloride and sodium sulphate were used to vary the ionic strength(μ). It was found that μ = 0.1 moldm^{-3} with respect to sodium sulphate is the most suitable value. All these studies led to the conclusion that the selective precipitation of calcium sulphate should be carried out 333k in a medium of ionic strength 0.1 moldm^{-3} (w.r.t. sodium sulphate) maintained at pH 3.2 Remarkably good results with 80% recovery calcium in the form of solid calcium sulphate was observed with an equimolar micture of calcium carbonate and magnesium carbonate. A sample of dolomite was found to give similar results under the above treatment.

Reference

Gunawardhana, H. Dasaratha and Dias, P.P.S.P. (1987) Nat. Sci. Counc. Sri Lanka (in press)

09th Dec. 1987 (Wednesday) 02.15 p.m. - 02.30 p.m.