

## Simulation of distributed parameter model and Comparative studies for packed bed recovery of magnesium

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### Abstract

Magnesite ore is the basic raw material for the manufacture of magnesium and its compounds which are used in various fields. The change in leaching characteristics of the magnesite ore in a packed column is analyzed by varying the process parameters viz. concentration of solvent, concentration of ore, height of packing and flowrate. Every other parameter is kept constant while varying one of the process parameters to try all the combinations.

The study is implemented in two phases of work. In the first phase, a simple mathematical model is used to theoretically represent the system and is simulated using MATLAB R2014a. In the second phase, the experimental studies are performed by varying the parameters. The dissolution kinetics of magnesite ore in acetic acid is obtained from literature [1]. It is found that the dissolution kinetics can be modelled by shrinking core model and is controlled by the surface chemical reaction. The values of the activation energy and frequency factor is obtained from Arrhenius plot. The experimental results are compared with the theoretical results. It is found that the leaching rate increased with increase in the concentration of the acid and flowrate.

Keywords: Magnesite ore, leaching, packed column, kinetics

### References:

1. Oral Lac, Banyamin Dfnmez, Fatih Demir, "Dissolution kinetics of natural magnesite in acetic acid solutions", *International Journal of Mineral Process*, pp. 91– 99, (2005).