

Chapter 1 The phosphogypsum problem

1.1 Introduction

Natural gypsum is mainly used in the production of plasterboard and as an additive in Portland cement production. It is found and mined on all the continents, and can easily be processed with technologies that require very low capital investment (Coburn *et al.*, 1989). The usefulness of gypsum as an industrial product is due to its ability to release its water of crystallization when heated. This then produces partially or totally dehydrated gypsum. On addition of water, the dehydrated product can be rehydrated to the original material, that is, set and hardened gypsum.

Although there are generally generous supplies of natural gypsum available, increasing quantities of by-product gypsum are produced by the chemical industry. Residual phosphogypsum from phosphoric acid plants has been a worldwide problem concerning the environment, disposal and handling. Its utilization raises public interest, and may provide economic benefits by leading to the conservation of mineral resources. Social benefits include the making available of land and reduction in the risks of pollution of the environment.

Phosphogypsum is the largest single chemical by-product in the world in terms of annual turnover (Mehta and Brady, 1977). It is often offered for sale at extremely favourable prices, but contains impurities which need decontamination and neutralization. This gypsum is at a disadvantage in comparison with natural gypsum, because of higher investment and production costs. Its use will only be economical if it is close to a consumer region, when natural gypsum is not available, or when natural gypsum has more expensive transport costs.

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