

## Utilization of the High Concentration Seawater —Development of the Low Energy Electrolysis Magnesium Technique—

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### Summary

Securing resources is an important issue in Japan because of its limited supply of natural resources. In particular, this island country is lacking in terrestrial resources. However, an enormous amount of marine resources is available if seawater is regarded as a resource. Seawater contains various elements. Establishing technologies for extracting such elements from seawater and collecting them can be a solution for the depletion of resources. In particular, magnesium extracted from seawater will be useful as an industrial material. Currently, there are two methods of smelting magnesium. One is the thermal reduction method (Pidgeon process), in which a mixture of sintered dolomite and ferrosilicon is heated at a high temperature in vacuum. Magnesium vapor generated by the reduction by silicon is cooled and coagulated. The other is the electrolytic method (Dow process), in which magnesium hydroxide is precipitated by adding lime milk to seawater and then the obtained precipitate is mixed with hydrogen chloride to produce magnesium chloride hexahydrate. This is dehydrated and electrolyzed using graphite electrodes to produce magnesium and hydrogen chloride. Magnesium chloride hexahydrate obtained during the process of condensing seawater cannot be directly applied to electrolysis and requires the dehydration process. In this paper, we report a method of dehydrating magnesium chloride hexahydrate to produce magnesium chloride.