# PI3) Synthesis of MgO powder from bittern using precipitation method

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## 1. Introduction

The precipitation of magnesium hydroxide is of great interest in the context of the manufacture of MgO from magnesium chloride in seawater or natural brines (Henrist et al., 2003). $Mg(OH)_2$ is one of the most important precursors of MgO (Zhang et al., 2014). $Mg(OH)_2$, which is the intermediate of MgO, is used mainly in industries of pharmaceutical, flame retardant of rubber, plastic, fiber and resin, preparation of electronic material, wastewater treatment and desulphurization of fuel gases (Booster et al., 2003). The nanoparticles of MgO were synthesized through decarboxylation/precipitation method in the presence of precipitants. The effects of operation parameters, such as NaOH and $Ca(OH)_2$ concentration, dilutionrate, rotation speed on morphology of nanoparticle size were investigated. The properties of the nanoparticles have been characterized by a XRD and SEM.

## 2. Matericals and Methods

Seawater bittern was discharged in the desalinization process of Hanju salt company. The $Mg^{2+}$ concentration of the seawater bittern was 35.34 g/L. The experiments were conducted in a 1 L glass beaker equipped with a stirrer and a temperature controller. The prepared samples were dried at 110$^{o}$C for 2 hr and then sintered at 500$^{o}$C for 4 hr to produce MgO powder. XRD patterns of the MgO crystals were recorded using a XRD. The morphologies of MgO crystals for the micro structural observation were analyzed using a SEM.

## 3. Results and Discussion

This study has an objective to produce high purity and quality of MgO crystals with bittern discharged in the salt-making process. The MgO crystals were synthesized through solution decarboxylation/ precipitation in the presence of precipitants. Morphology and particle size of nano-MgO particles synthesized in seawater bittern were studied. It has been shown that the chemical nature of the base precipitant, NaOH and $Ca(OH)_2$, is of prime importance. The MgO crystals can be observed due to the aggregation of spherical and cubic shapes with rounded edges. This condition can also be applied to synthesize nano-MgO particles in an industrial plant of $Mg(OH)_2$ or MgO recovery using any other raw material.

## 4. References

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