

## A Pilot Study on Utilizing Mg-bearing Minerals from Salt Lakes for CO<sub>2</sub> Storage

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Global warming caused by rapid increase of carbon dioxide (CO<sub>2</sub>) concentration in atmosphere has forced scientists and engineers looking for CO<sub>2</sub> emission reduction methods, such as Carbon Capture, Utilization, and Storage (CCUS). Mineral sequestration is one of these strategies, which offers advantages like thermodynamic stable products and free from CO<sub>2</sub> leakage. Salt lakes in northwestern China hold large amount of Mg elements in water while potash fertilizer production industry produces massive Mg-bearing salts by-products, which are promising raw materials for CO<sub>2</sub> sequestration. Qarhan Salt Lake—located in the south of Qaidam basin—can offer more than 2 billion tons of Mg-bearing salts, which we can utilize to develop a process for CO<sub>2</sub> storage.

Mg-bearing minerals (Mg)  $\xrightarrow{\text{CO}_2}$  Mg carbonates  
The main form of Mg carbonate produced is nesquehonite (MgCO<sub>3</sub>•3H<sub>2</sub>O), while the final product is converted to hydromagnesite (Mg<sub>5</sub>(CO<sub>3</sub>)<sub>4</sub>(OH)<sub>2</sub>•4H<sub>2</sub>O) for better utilization, say, the materials of ceramics and building.

A pilot scale demo capturing boiler flue gases is under constructing in Nanjing, China. The designed absorption capacity of flue gas is 210 m<sup>3</sup>/h with 15v% CO<sub>2</sub> under standard condition. Output of Mg carbonate (hydromagnesite) product is estimated to be 160 kg/h.