

Promising Rocks for CO₂ Capture & Storage

The main types of CO₂ Capture and Storage (CCS) are: (i) *mineral carbonation*, (ii) *geological storage*, and (iii) *ocean storage*. Mineral carbonation can be carried out either *in situ*, by injecting CO₂ into specific geological formations (Matter and Kelemen, 2009; Gislason et al., 2010; Gislason and Oelkers, 2014), or *ex situ* in a chemical processing plant, after mining and pre-treating the rock material (Gerdemann et al., 2007; Oelkers et al., 2008; Pronost et al., 2011). The goal of the CO₂NOR Project is to propose an efficient method (*ball milling*) for enhancing the *ex situ* carbonation of ophiolitic rocks.

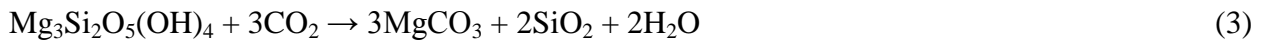
The purpose of mineral carbonation is to create stable carbonate minerals such as magnesite (MgCO₃), calcite (CaCO₃) and dolomite (CaMg(CO₃)₂), by reacting CO₂ with natural metal oxides (Oelkers et al., 2008; Matter and Kelemen, 2009; Kelemen et al., 2011). These metal oxides are principally the oxides of divalent cations Mg²⁺, Ca²⁺ and Fe²⁺ that are found in the crystal structure of many mineral phases. Silicate minerals with the highest potential for CO₂ mineralization are olivine, pyroxene, serpentine and plagioclase. Substantial quantities of all the above mineral phases occur in the *ultramafic* and *mafic* rocks of ophiolite complexes. The main carbonation reactions of ophiolitic rocks are summarized below:



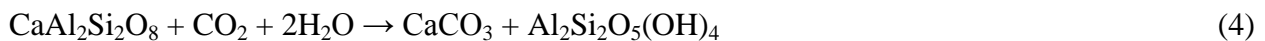
FORSTERITE MAGNESITE SILICA



ENSTATITE MAGNESITE SILICA



SERPENTINE MAGNESITE SILICA



ANORTHITE CALCITE KAOLINITE

References

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