

Thermodynamic Approach to Wettability of CO₂/Brine/Mineral System by Augmented Young Laplace Equation

*Masashige Shiga^{1,2}, Masao Sorai¹, Masaatsu Aichi², Hiromi Honda²

1. AIST, 2. The University of Tokyo

CO₂ Geo-Sequestration (CGS) has been regarded as one of the most significant technologies to reduce the amount of CO₂ emissions into the atmosphere.

Sealing performance of the caprock in the geological formation is largely influenced by wettability which is evaluated by the contact angle of the CO₂/Brine/Mineral system.

A lot of researchers have measured the angles in various conditions (e.g. pressure, temperature, salinity, or types of minerals) by various methods.

However, the value and the trend of the contact angle have not been confirmed yet.

This is mainly because there are a lot of inconsistencies in the experimental data due to the difficulties of controlling the surface roughness or impurities.

In order to tackle this problem, we calculated the contact angle and studied the key factor to affect its value by using augmented Young Laplace equation in which a thickness of the film on the mineral substrate is considered as a thermodynamic variable.

Parameters of the interfacial properties were calculated by PhreeqC, which is a simulator performing a wide variety of aqueous geochemical calculations.

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