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Experiments and numerical modeling of CO_2-brine-caprock interaction of the potential storage site within the Pohang basin in Korea

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Long term containment of stored CO_2 in deep geological formation will be dependent on the performance of the caprock to prevent the buoyant CO_2. The study aims to identify CO_2-brine-caprock interactions and develop a framework, within which, geochemical reaction in caprock due CO_2 injection can be evaluated. A series of autoclave experiments were conducted with caprock from drilling cores of Pohang basin where many researches have been focused as a candidate for geological CO_2 sequestration at 50[U+2103] with 100 bar of CO_2 for 15day. XRD, XRF, ICP-OES and SEM-EDS studies were performed to characterize the reaction products. Also the numerical modeling with use of Geochemist's Workbench 10.0.6 (GWB) in two stages was performed. The first one was aimed at simulating the immediate changes in the aquifer and insulating caprocks impacted by the beginning of CO_2 injection (100 days), the second enabling assessment of long-term effects of sequestration (10000 years). The simulations allowed to determine the suitability of the formation for carbon dioxide storage.