Geophysical Research Abstracts
Vol. 15, EGU2013-2706-1, 2013
EGU General Assembly 2013

Carbon dioxide sorption/ desorption characteristics of coals in Taiwan

Hsiao Chien-Hung and Tsai Loung-Yie
The Institute of Applied Geology, National Centeral University, Taoyuan, Taiwan (kobe29200109@gmail.com)

Geological sequestration of CO_2 into depleted oil reservoir, saline aquifer or unmineable coal seam is now being actively investigated for the purpose of reducing greenhouse gas in the atmosphere. Understanding the physical, chemical, and thermodynamic phenomena occurred with CO_2 injection is very important in marking a reliable prediction of sequestration. This study examined the feasibility of carbon dioxide sequestration into unmineable coal seams in Taiwan. A total of 20 Miocene-aged coal samples from Western Foothill Belt, NW Taiwan, were collected. The stratigraphy include Mushan, Shihti, and Nanchuang Formation from bottom up. Proximate and petrographic analyses include maceral composition, Vitrinite reflectance were also measured. Carbon dioxide adsorption isotherms were analyzed at 35 degrees Celsius and up to 800 psi, by using a gravimetric ad/desorption apparatus. Isotherms were then fitted with a modified Langmuir Isotherm model by using Langmuir Pressure and Langmuir Volume so the model can be applied to supercritical conditions. According to the result of adsorption experiment, the pressure and temperature were quite significant. The gas storage capacity of CO_2 was about 400 600 scf/ton at pressure up to 800 psi. Comparing the results of adsorption capacity with Proximate analysis and vitrinite reflectance, the Langmuir Volume shows a strong positive correlation with fixed carbon and vitrinite content. Furthermore, Adsorption capacity is closely related to micropores which were also rank and maceral dependent. It is noticed that the observed coal pore structures were affected by rank, and then exhibit have different diffusion rate of CO_2.Finally, images under SEM were evaluated to understand the pathways of gas sorption.