

High Pressure Adsorption of Pure CO₂, CH₄
and CO₂/CH₄ Mixture on Korean Coal

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ECBM (Enhanced Coal Bed Methane) recovery process can be used to reduce greenhouse gas emission through the disposal of carbon dioxide into coal seams. The production of methane can also be accelerated with CO₂ sequestration since CO₂ competitively adsorb on coals by replacing pre-adsorbed CH₄. Therefore, knowledge of pure and mixture gas adsorption behavior on coal is necessary for the accurate assessment of ECBM operation. Pure CO₂, CH₄ and their binary mixture adsorption experiments were carried out on coal (Kyungdong coal, South Korea). The volumetric method was used coupled with gas chromatographic analysis.

The adsorption was measured at 318K and 338K in the range from 0 to 150 atm on dry and wet coals, respectively. In the case of mixture gas, the feed gas composition was around 80 mol% CO₂. Since coal swells by high pressure CO₂ adsorption, excess adsorption was presented by taking the swelling into consideration. Moisture effect was considered in evaluating sorption capacity of wet coal. Adsorption isotherms of mixture gas were lying on between pure gas isotherms, and preferential adsorption of CO₂ could be confirmed.