Analysis for Adsorption and Dissolution Mechanisms of CO_2 and CH_4 in Korean Coal

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In this study, a model for carbon dioxide adsorption is suggested based on a combination of surface adsorption and dissolution into the coal matrix. The model for methane adsorption involves only a surface mechanism. This model is used to understand the adsorption behavior of pure carbon dioxide, pure methane and their mixture as a function of pressure from 1 to 160 atm and as a function of temperature at 318 and 338 K. The model is derived from statistical mechanics and provides necessarily an idealized description of the heterogeneous nature of coal.
This model is well fitted with our experimental data and also provides useful information such as binding energies, surface areas, absolute adsorption isotherms as well as isotherms in terms of the fractional occupancy.