

Measurement of the Solubility of Water in the liquid Carbon dioxide rich phase and Correlation Using the Cubic-Plus-Association Equation of State

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Research and development was conducted with increasing concern about global warming to reduce the emissions of greenhouse gases, especially CO₂. Thus, reducing the emission of CO₂ has become a very important issue around the whole globe recently. However, it is difficult to reduce the amount of CO₂ emission dramatically. So, methods to capture and store CO₂ in deep sea or underground for long time are suggested. Among these methods, the sequestration of CO₂ in coal-beds has been studied by many researchers. In addition, experimental data of the mutual solubilities of CO₂ and water are important to evaluate the possibility of CO₂ sequestration in geological formations. In this work, solubilities of water in the carbon dioxide rich phase were obtained by an indirect measurement method at the temperatures ranging from 283K to 312K and pressures of 8.1, 10.1 and 20.1 MPa. The experimental data are compared with literature data at each pressure. The measured results were also calculated and analyzed using the CPA EoS, considering the association of water molecules and the solvation effect between water and CO₂.