Thermodynamic Modeling for Calculating Mutual Solubility of CO_2 and Water Mixtures

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Accurate prediction of CO2 solubility over a wide range of temperature and pressure is very important in the study of geological CO2 sequestration. Especially, the information about the phase equilibrium data of CO2 and water solubility is necessary for understanding the feasibility of CO2 geologic sequestration. In this work, mutual solubility of CO2 rich phase (generally gas) and water rich phase (liquid) are correlated by Peng-Robins Equation of State and Nonrandom Lattice Fluid Equation of State with Hydrogen Bonding (NLF-HB EoS). The pure parameter and binary interation parameter were optimized in this calculation. Experimental data on the solubility of CO2 and water were collected from literature and the calculated data were compared with results by the thermodynamic models.