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Please fill in your abstract title.	Measurement of CO ₂ Solubility in Pure Water for Temperatures between 313.15 to 473.15 K and Pressure between 0.5 to 200 MPa	
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Abstract

Objectives/Scope

CO₂ solubility data in water at geological temperature and pressure conditions is important in global carbon cycle researches, enhanced oil recovery, and CO₂ capture and storage.

Methods, Procedures, Process

A delicate experimental apparatus has been designed to measure the solubility of CO₂ in pure water at a wide range of temperature (313.15-473.15 K) and pressure (0.5-200 MPa). The measured solubility is in good agreement with the published data. The dependence of solubility on pressure and temperature was investigated and a reliable pressure-temperature-solubility model was obtained from curve fitting.

Results, Observations, Conclusions

The dependence of CO₂ solubility on temperature and pressure varies in different regions. In the low-pressure region, the solubility depends predominantly on pressure and the solubility value is small (generally smaller than 1 mol/kg). In the intermediate region, solubility depends mostly on pressure but the dependency is less than that in the low-pressure region. In the high-pressure region, temperature outweighs pressure in influencing the solubility. In this region, when temperature is below 339 K, the solubility increases with increasing pressure and decreasing temperature. When temperature is above 339 K, the CO₂ solubility increases with increasing pressure and temperature. The increase in the CO₂ solubility becomes more pronounced at elevated temperatures.

Novel/Additive Information

The CO₂ solubility measured in our experiments can provide more accurate data for HPHT CO₂ phase behavior and analysis of subsurface carbon cycle and carbon storage.