

Determination of critical point of H₂O-CO₂-X systems by spectrum measurement

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Physicochemical state of H₂O are divided into three phases, solid, liquid and vapor. Especially, the vapor-liquid phase boundary is called the saturated steam pressure curve. The highest point of this curve is called the critical point. Liquid density becomes equal to gas density at that point. The fluid of that state is called supercritical fluid (water). Supercritical fluids exist near the deep-sea hydrothermal vent or in the Earth's crust.

Supercritical fluid has a characteristic property that chemical reactivity, solubility and/or ion product. It is very important for the understandings of crustal rocks and fluid interaction. Therefore, decision of state and supercritical point of crustal fluid is very important.

The fluid near a critical point has intense density fluctuation, so, it is considered that the optical transmissivity is very low.

The purpose of this study is to observe the state of the optical property of the fluid near the critical point, in order to develop a method for the critical point determination of multicomponent fluid by the spectral measurement of the transmitted light through the fluid.

Keywords: critical point, supercritical fluid, spectrum measurement