

Phasendiagramme oberhalb des kritischen Punkts

Phase Diagrams beyond the Critical Point

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Abstract

Following a path in the usual p-T-diagrams of one-component systems via the supercritical region it seems that one can make a transition from the liquid to the gas phase (and in reverse) without traversing a phase boundary curve, whereas in the sub-critical region one clearly has to pass a phase boundary curve. To solve this paradox situation, the phase diagrams of one-component systems are analyzed with respect to the phase transition from the liquid to the gas state in the sub- and supercritical range. It is shown that the critical point is not an isolated point or an end point on the phase boundary curve between the gaseous and the liquid phase in a p-T-diagram. Instead, it marks on the boundary curve just the transition between the section of a first order phase transition in the sub-critical range and the section of a second or higher order phase transition in the supercritical range. Thus, the present phase diagrams of one-component systems are incomplete with respect to the phase boundary curve between liquid and gas in the supercritical region. The result is illustrated using the model of a van der Waals gas.

Key words: phase diagram, liquid-gas phase transition, critical point, van der Waals gas, supercritical state