Derivation of Cailletet-Mathias law from Van-der-Waals equation

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Abstract

Empirical Cailletet-Mathias law used for determination of parameters of critical point is derived theoretically on the basis of Van-der-Waals equation, Maxwell rule and condition of equality of pressures and temperatures of vapor and liquid coexisting in equilibrium.

The dependencies on temperature of vapor saturation pressure, densities of coexisting in equilibrium vapor and liquid of matter described by Van-der-Waals equation of state are obtained.