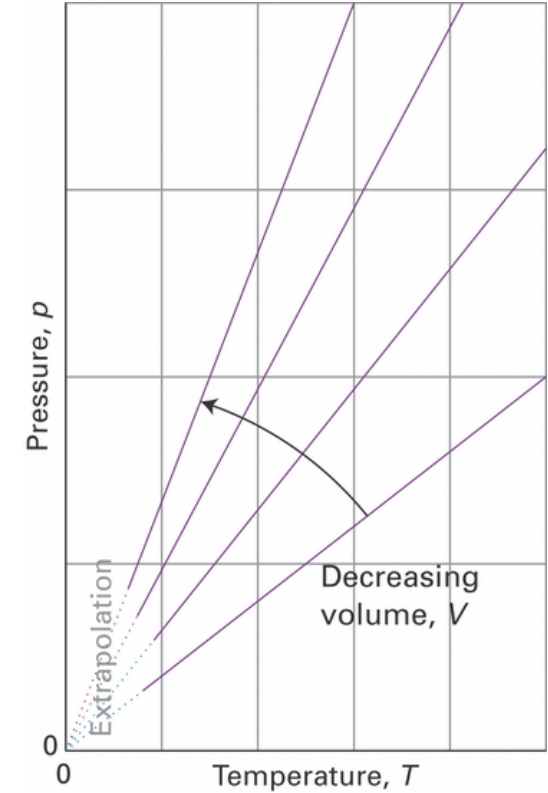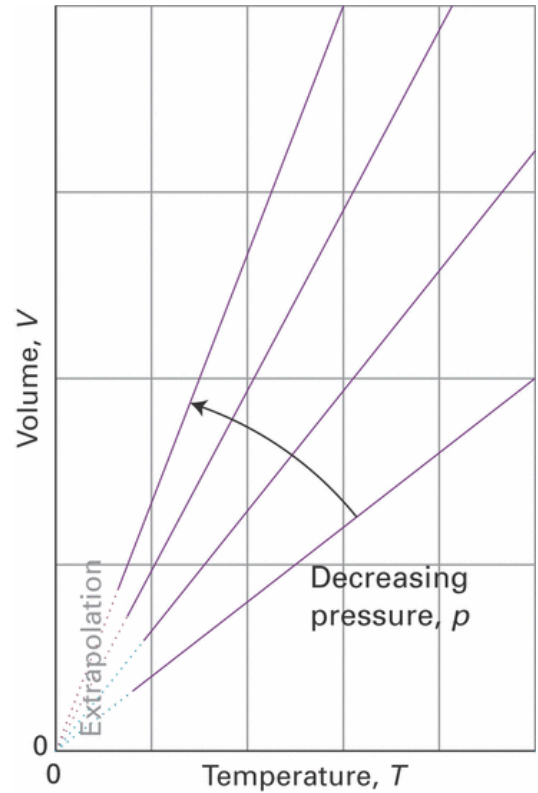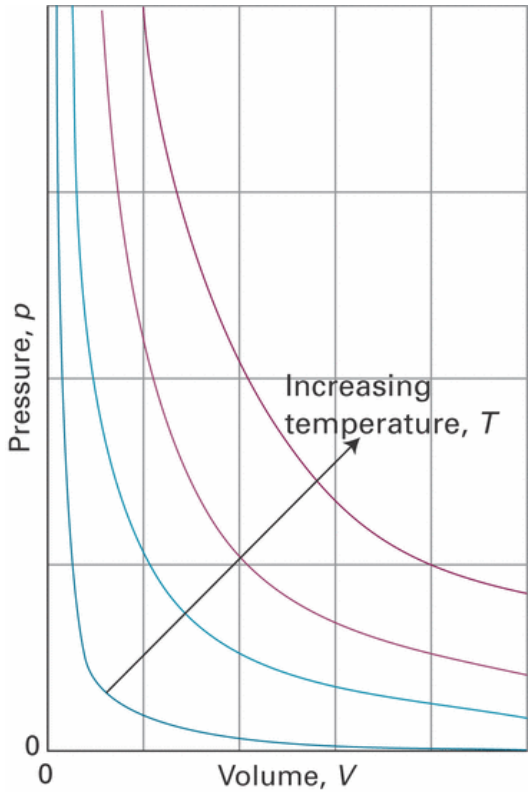# Physikalische Chemie II (PCII) – Thermodynamik

Vorlesung und Übung (LSF#105129 & LSF#101277) - SWS: 4 + 2

SoSe 2013

Prof. Dr. Petra Tegeder

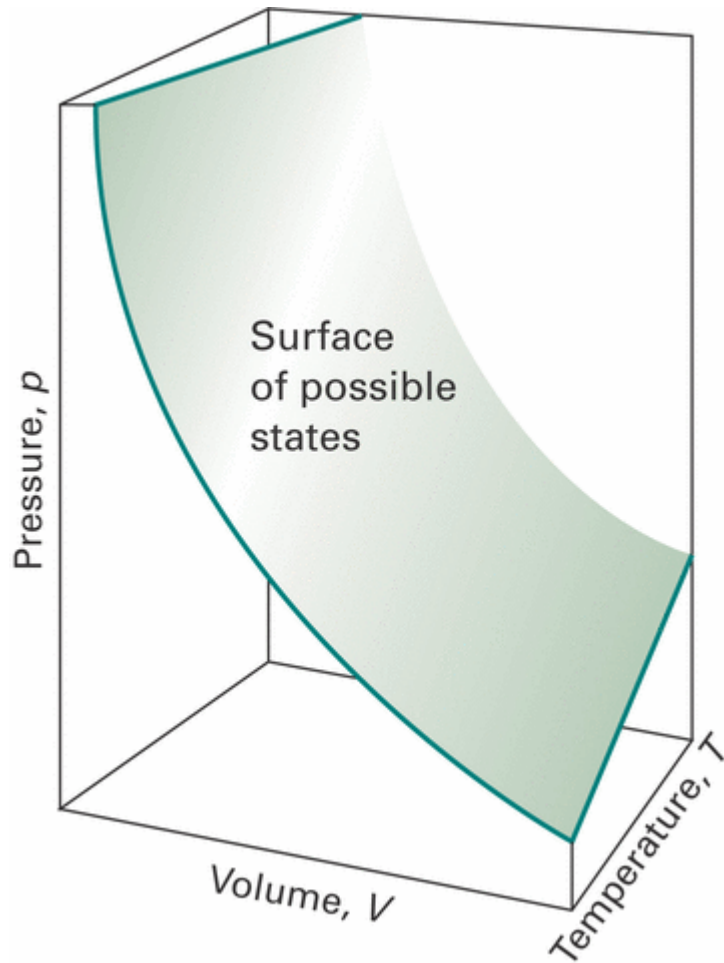*Ruprecht-Karls-Universität Heidelberg; Fachbereich Chemie, Physikalisch-Chemisches Institut*
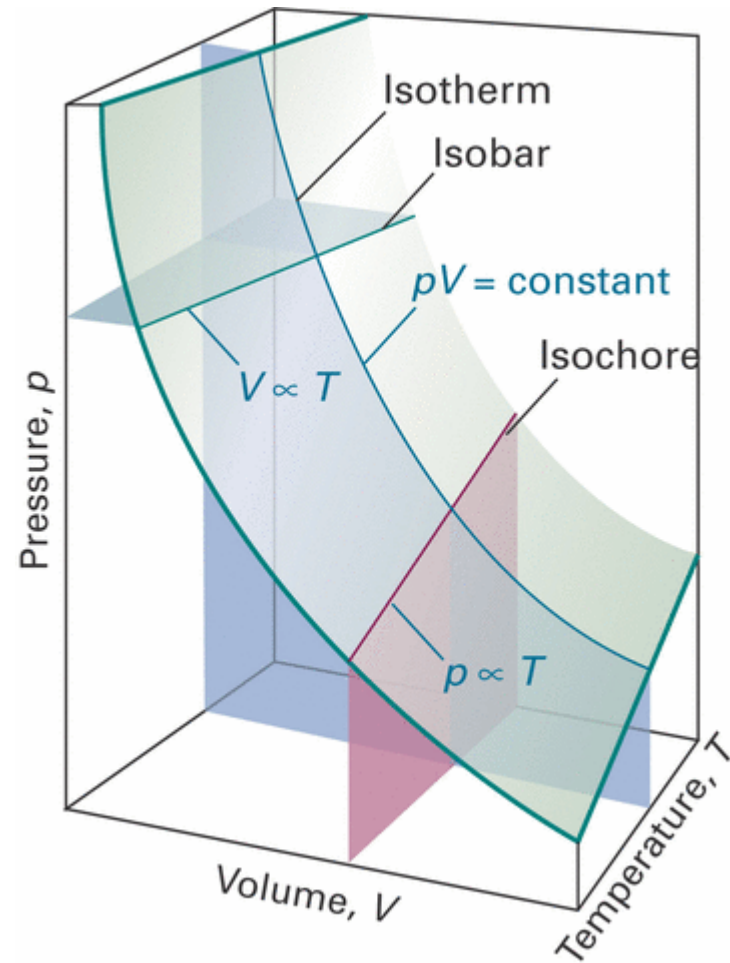
tegeder@uni-heidelberg.de

Ideales Gas

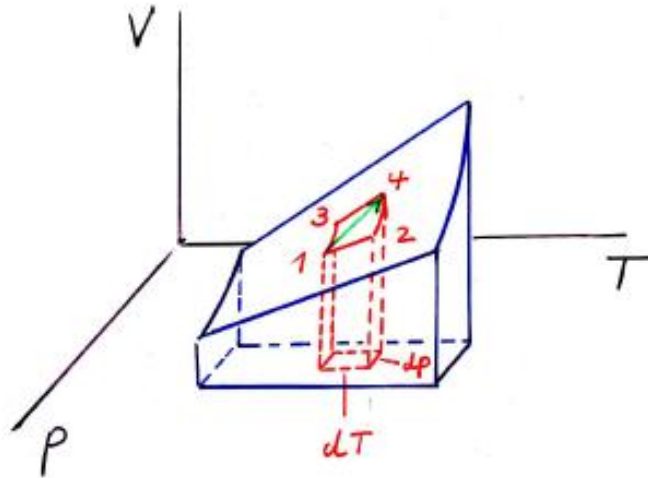Quelle: P. Atkins, J. de Paula; Physical Chemistry

Ideales Gas

A region of the *p,V,T* surface of a fixed amount of perfect gas. The points forming the surface represent the only states of the gas that can exist.

Quelle: P. Atkins, J. de Paula; Physical Chemistry
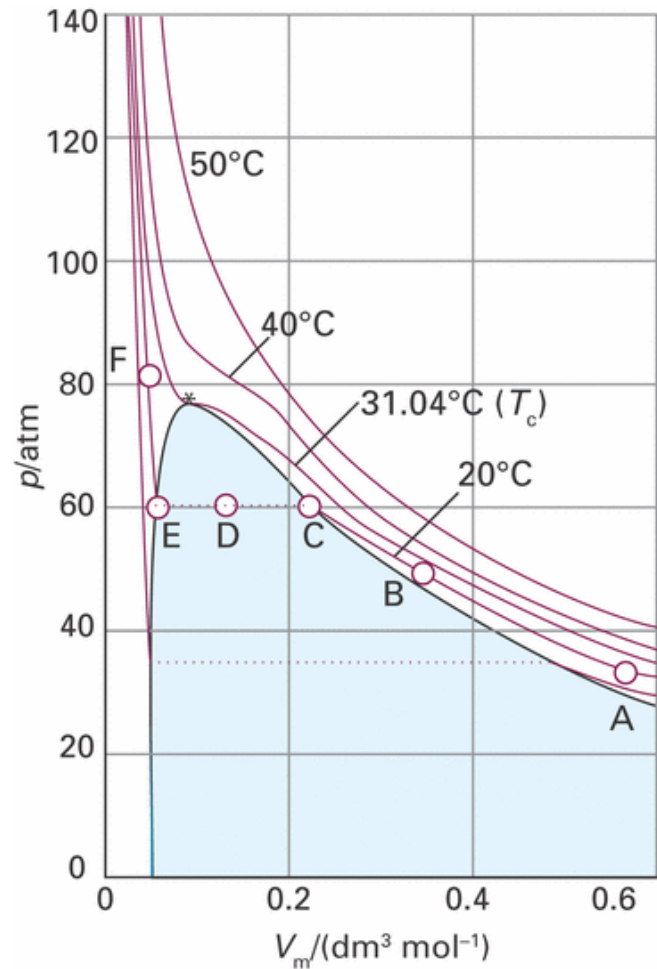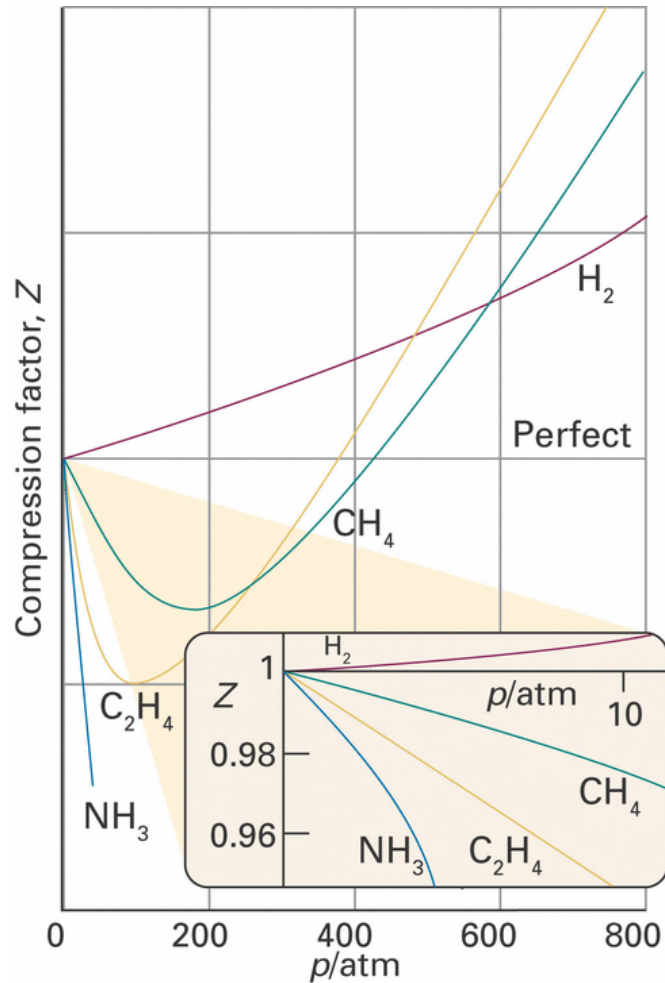
Zustandsfunktion

$$V = V(T, P)$$

$$dV = \left(\frac{\partial V}{\partial T}\right)_P dT + \left(\frac{\partial V}{\partial P}\right)_T dp \qquad (1 \to 2 \to 4)$$

$$= \left(\frac{\partial V}{\partial P}\right)_T dp + \left(\frac{\partial V}{\partial T}\right)_P dT \qquad (1 \to 3 \to 4)$$

dV: totales Differential

$\dfrac{\partial V}{\partial P}$: partielle Ableitung

Reales Gas

The variation of the compression factor, Z, with pressure for several gases at 0°C. A perfect gas has $Z = 1$ at all pressures. Notice that, although the curves approach 1 as $p \to 0$, they do so with different slopes.

Experimental isotherms of carbon dioxide at several temperatures. The 'critical isotherm', the isotherm at the critical temperature, is at 31.04°C. The critical point is marked with a star.

Quelle: P. Atkins, J. de Paula; Physical Chemistry