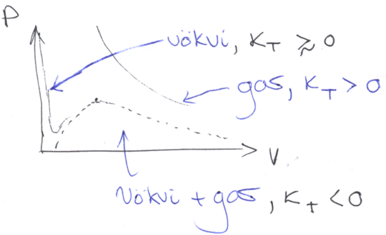
.... Raungas



$$\kappa_T = -\frac{1}{V}\left(\frac{\partial V}{\partial p}\right)_T$$

van der Waals

veikur aðdráttarkraftur

$$\left\{p + \frac{a}{V_m^2}\right\}(V_m - b) = RT$$

Kemur vegna stærðar sameinda, hard core fráhrinding

Eitt af mörgum „phenomenological" líkönum

Finnum markpunktinn, þ.s. beygjuskil verða

$$p = \frac{RT}{V-b} - \frac{a}{V^2}$$

$$(*) \quad \left(\frac{\partial p}{\partial V}\right)_T = -\frac{RT}{(V-b)^2} + \frac{2a}{V^3} = 0$$

$$(**) \quad \left(\frac{\partial^2 p}{\partial V^2}\right)_T = \frac{2RT}{(V-b)^3} - \frac{6a}{V^4} = 0$$

$$\rightarrow \quad \frac{3(V-b)}{V} = 2$$

$$\hookrightarrow V_c = 3b$$

notum í (**)

$$\hookrightarrow T_c = \frac{8a}{27Rb}$$

Innsetning í ástandsjöfnuna gefur þá

$$p_c = \frac{a}{27b^2}$$

og ennfremur

$$\frac{p_c V_c}{RT_c} = \frac{3}{8} = 0{,}375$$

$$\left(\frac{\partial p}{\partial V}\right)_{T_c} = 0 \quad \downarrow$$

$$\kappa_T = -\frac{1}{V}\left(\frac{\partial V}{\partial p}\right)_T \to \infty$$

í þeim punkti

Lögmál samsvarandi ástanda

Gös sem lýst er með ástandsjöfnu van der Waals hafa mism. fasarit þ.s. a og b eru breytilegir fastar

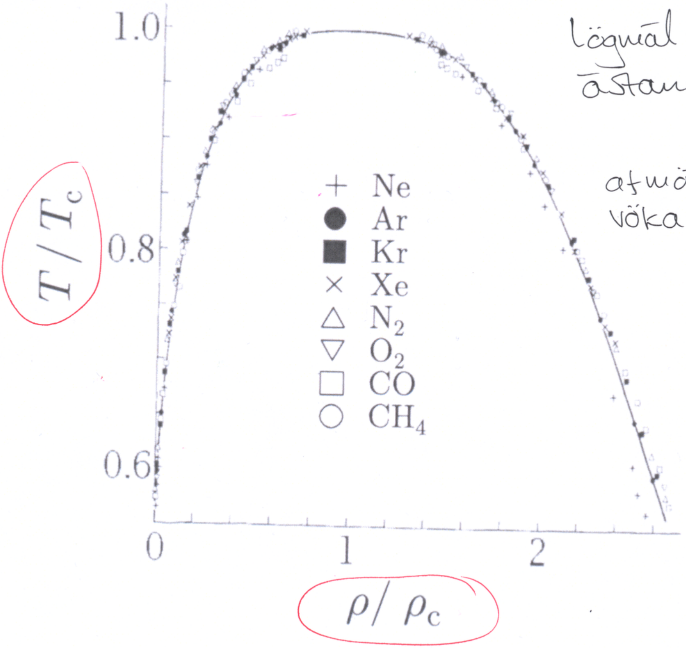
En ef notaðar eru skertar eða skalaðar breytur

$$\tilde{p} = \frac{p}{p_c}, \quad \tilde{V} = \frac{V}{V_c}, \quad \tilde{T} = \frac{T}{T_c}$$

verða fasaritin öll samstæð enda verður ástandsjafnan

$$\left\{\tilde{p} + \frac{3}{\tilde{V}^2}\right\} = \frac{8\tilde{T}}{3\tilde{V} - 1}$$

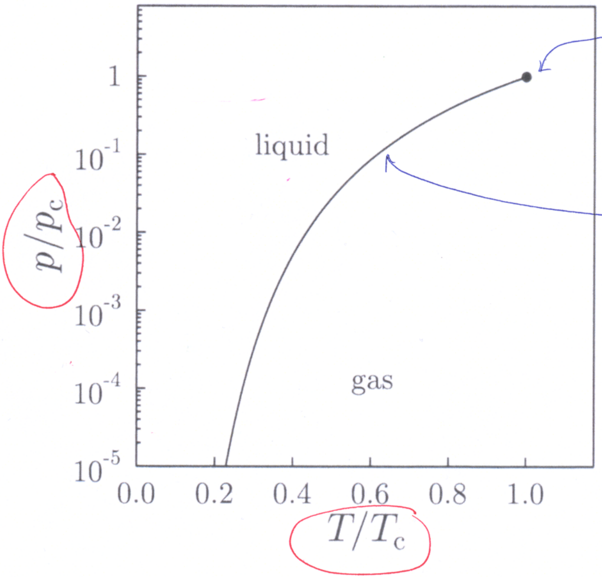
a og b eru horfin!



Lögmál samsvarandi ástanda

af mörkum vöka-gas samlifis

Blundell og Blundell



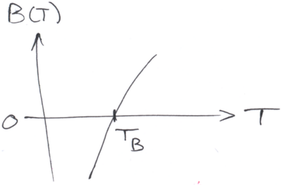
endar í T_c

afmörkun vökva-gass samlífis

Ef $p > p_c$ og $T > T_c$ er engin skörp mörk til milli fasanna tveggja!

Virial-liðun, eftir-liðun

$$\frac{pV_m}{RT} = 1 + \frac{B(T)}{V_m} + \frac{C}{V_m^2} + \cdots$$



$$B(T_B) = 0$$

hitastig Boyles því þá gildir lögmál hans

$$p \sim \frac{1}{V}$$

Ef paravíxlverkunin er $U_{P.E.} = \sum_{i \neq j} \frac{1}{2} V(|\bar{r}_i - \bar{r}_j|)$

má finna að

$$B(T) = \frac{N}{2} \int d^3r \left\{ 1 - e^{-\beta V(r)} \right\}$$

Kerfisbundnar flóknar aðferðir hafa verið notaðar til að reikna hærri liði í liðunni, enda mjög mikilvægir í líkanagerð