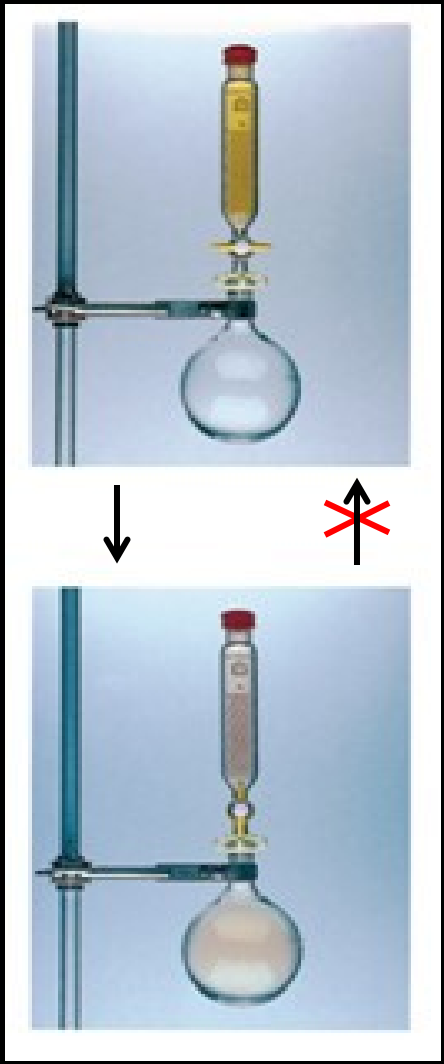
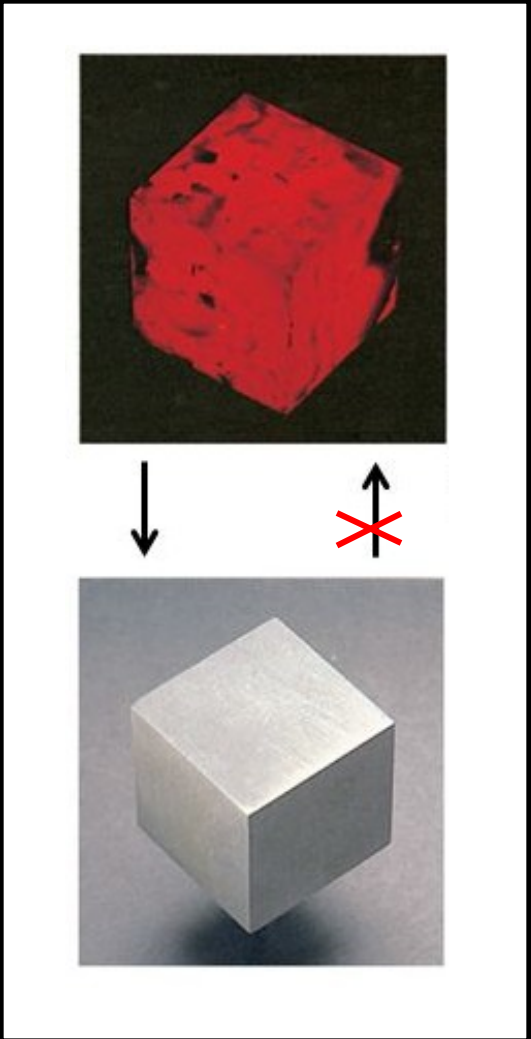
Přednáška 4

Druhý zákon termodynamiky

Literatura: Atkins + de Paula Fyzikální chemie
Kapitola 3

3. Spontánní změna



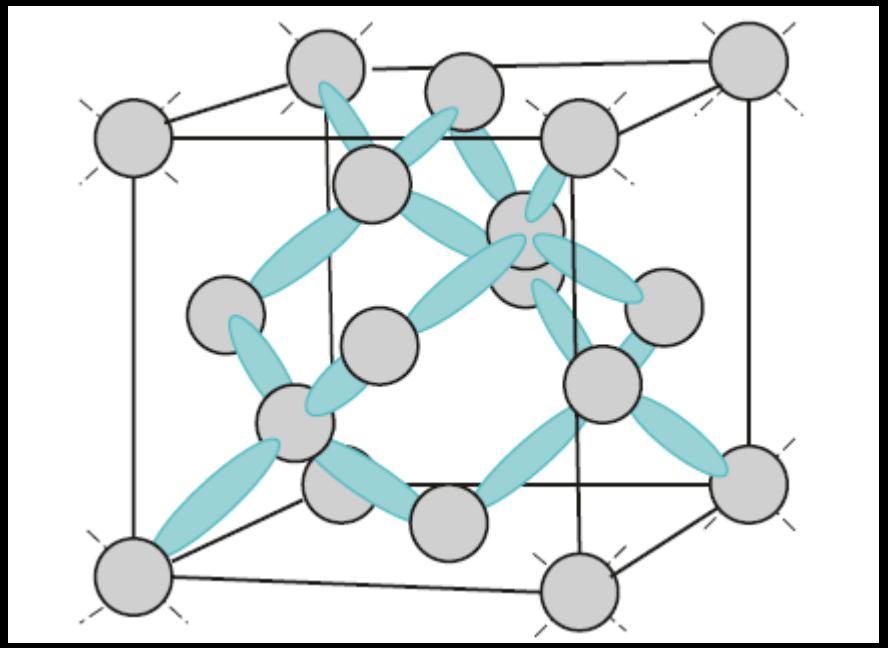


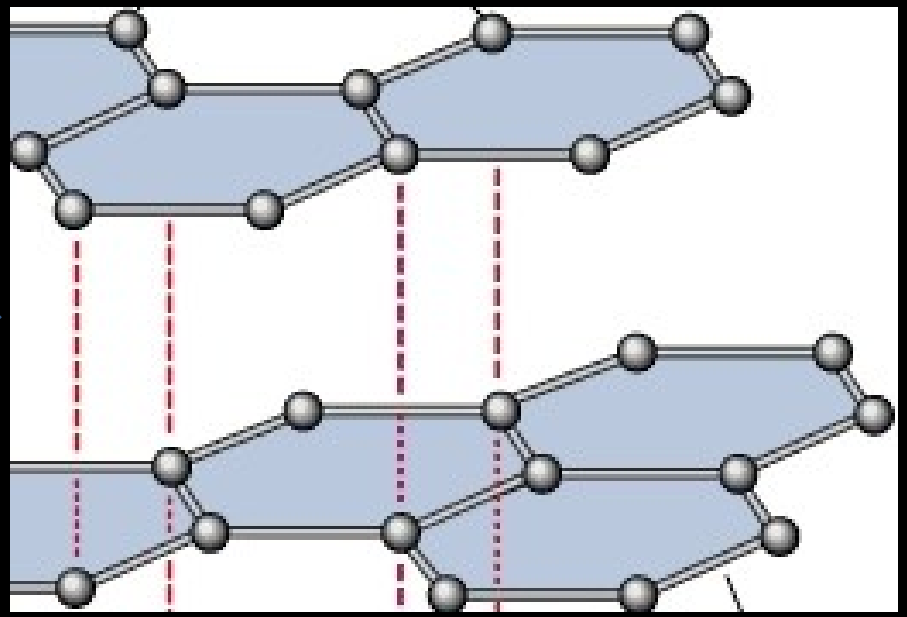
Spontánní změna NEMUSÍ nastávat RYCHLE

Video of "Molecular diffusion is a very slow process"

https://teachingfluids.wordpress.com/2014/11/03/video-of-molecular-diffusion-is-a-very-slow-process/

Příklad extrémně pomalé spontánní změny:

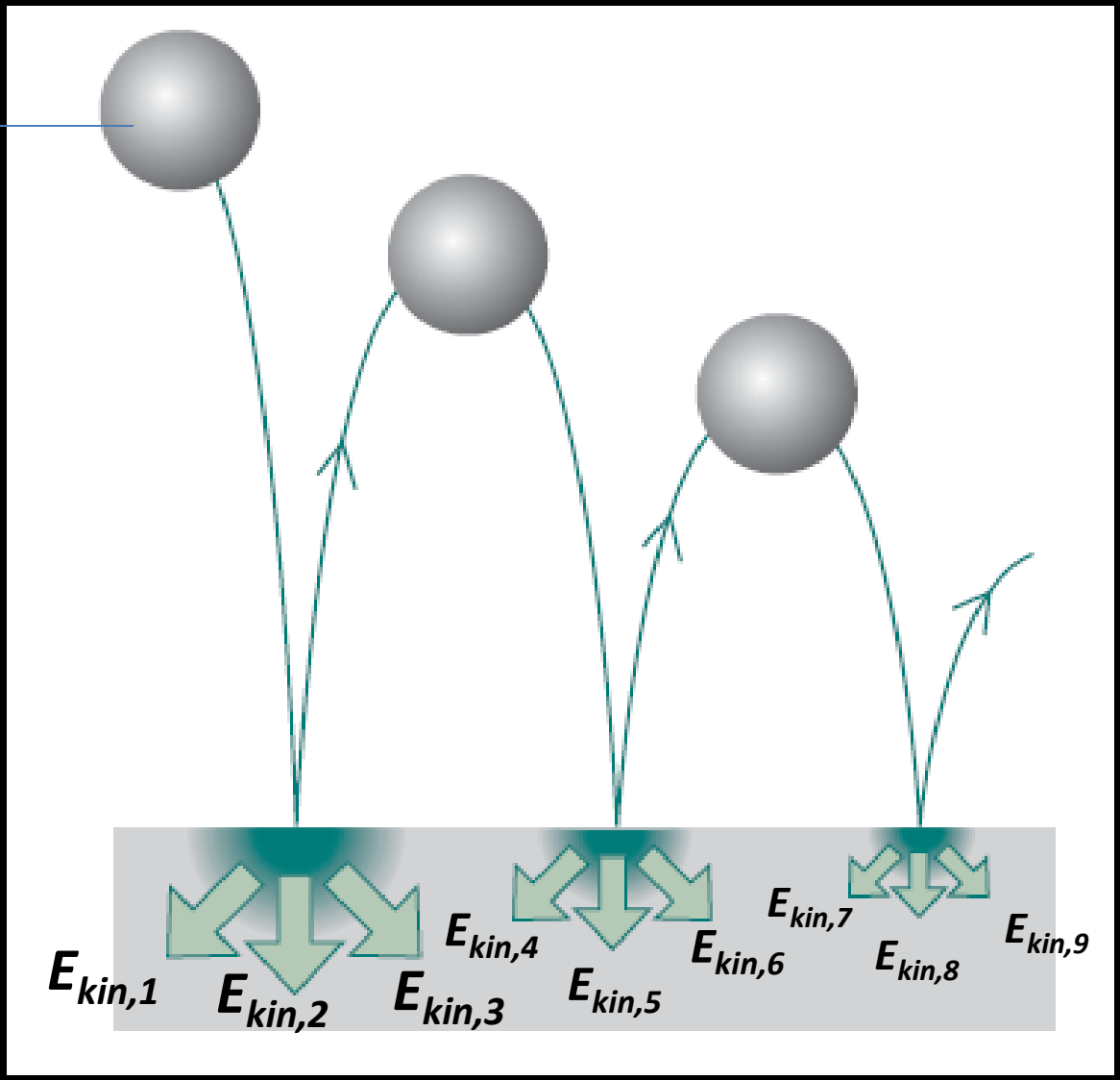




Scientists watch diamond turn into graphite

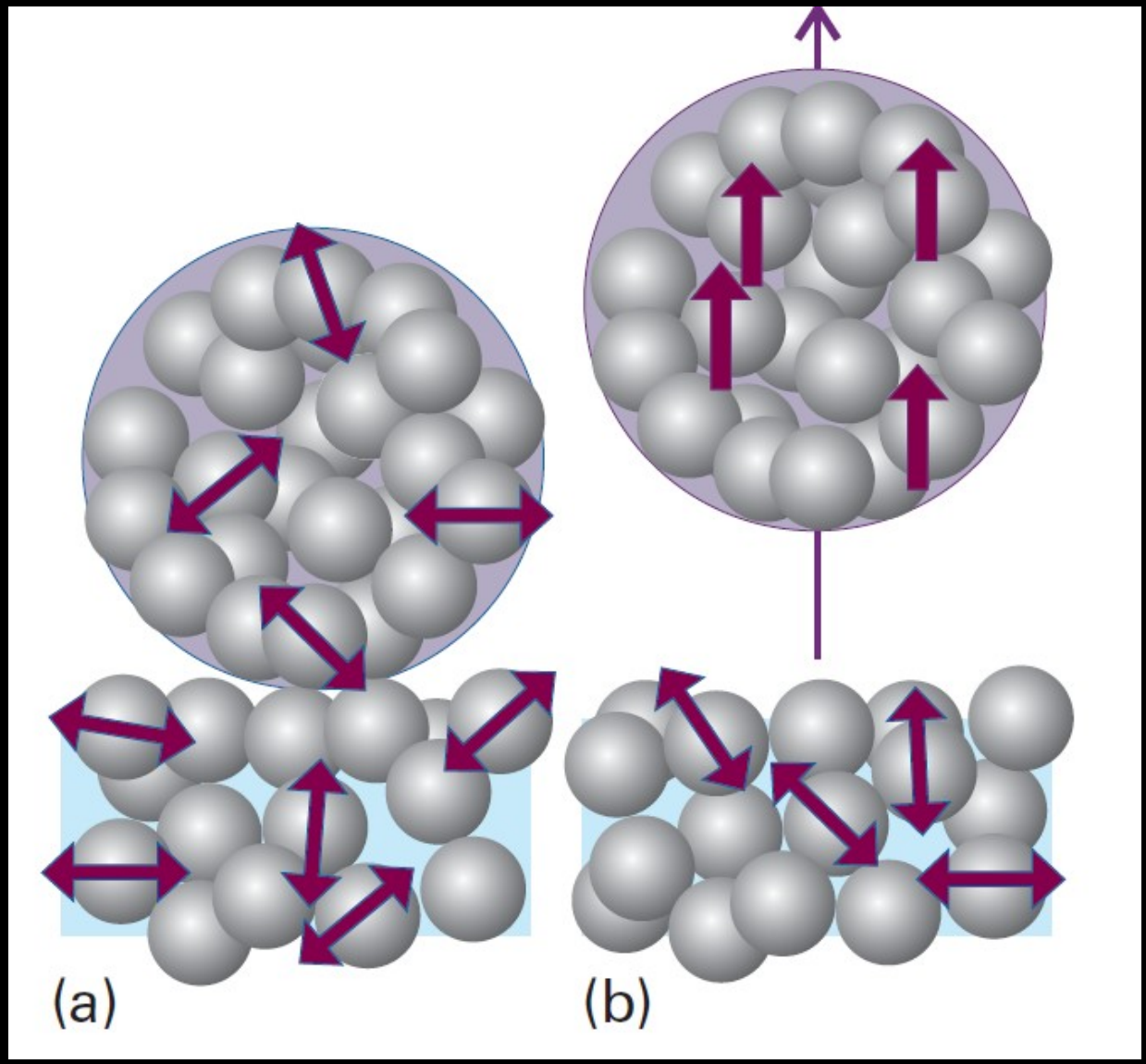
December 8, 2017, Deutches Elektronen-Synchrotron

3.1.1 Disipace energie



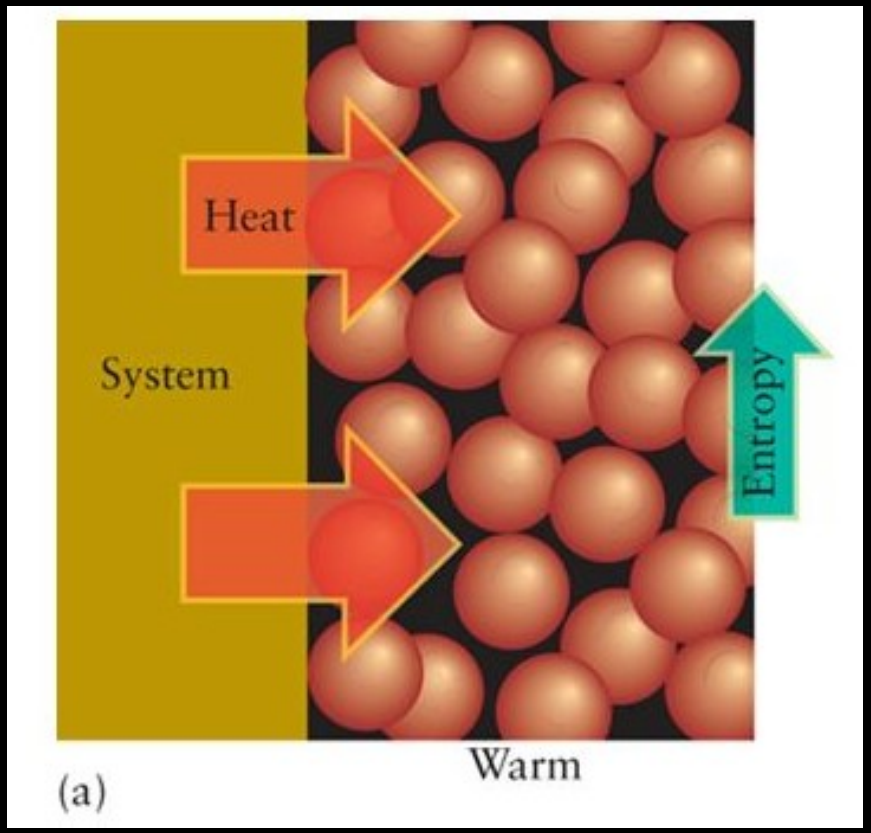
3.1.2 Entropie (S)

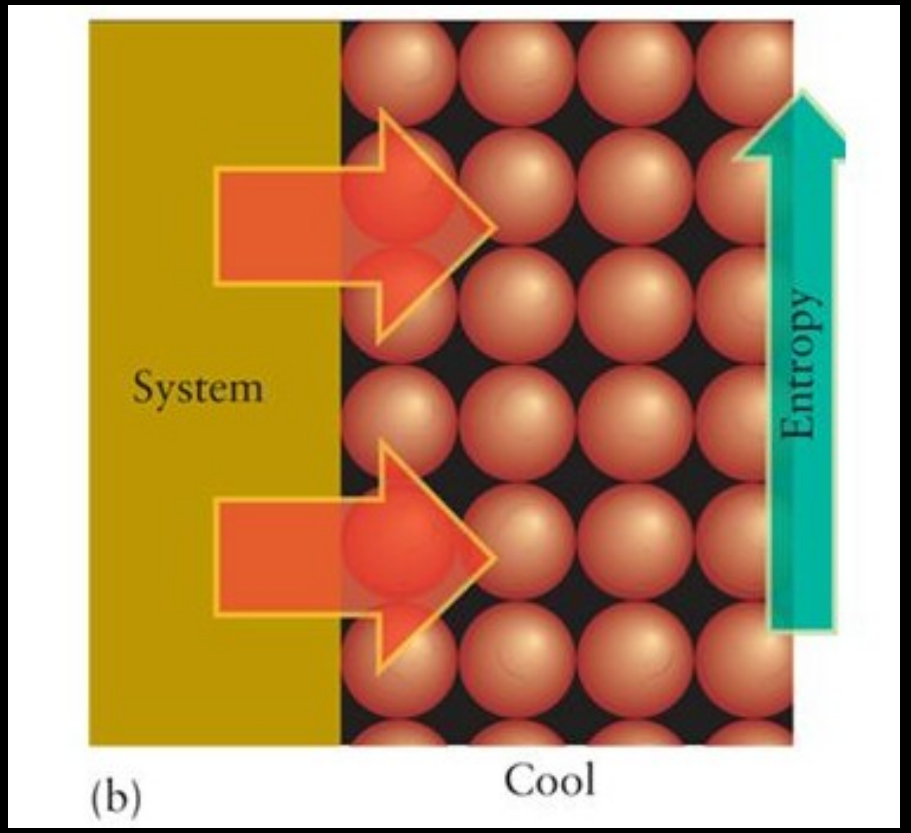
S(a)



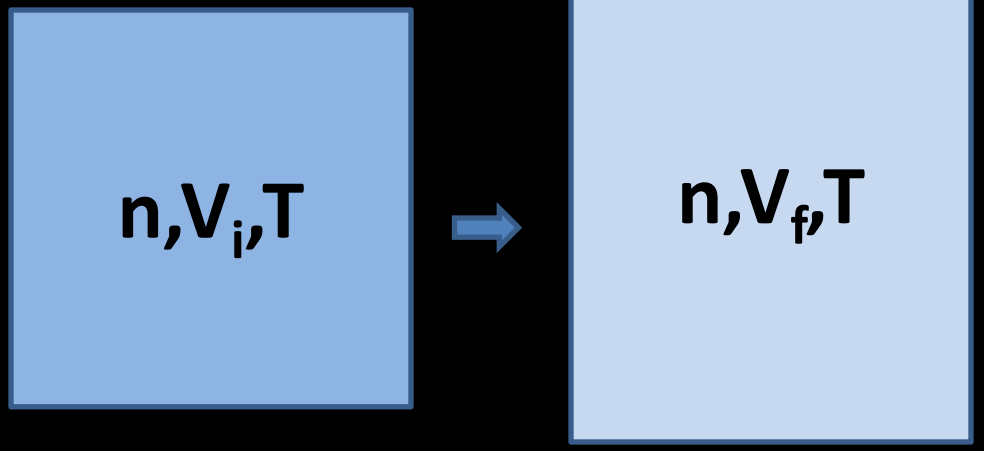
S(b)

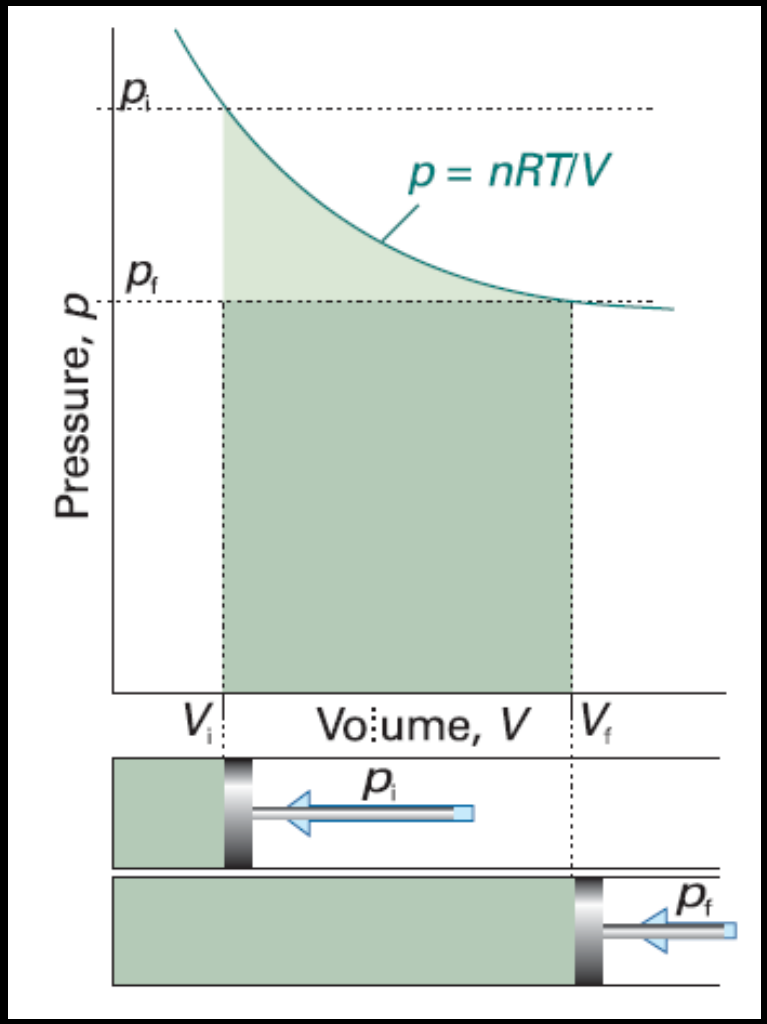
3.1.2.1 TD definice entropie



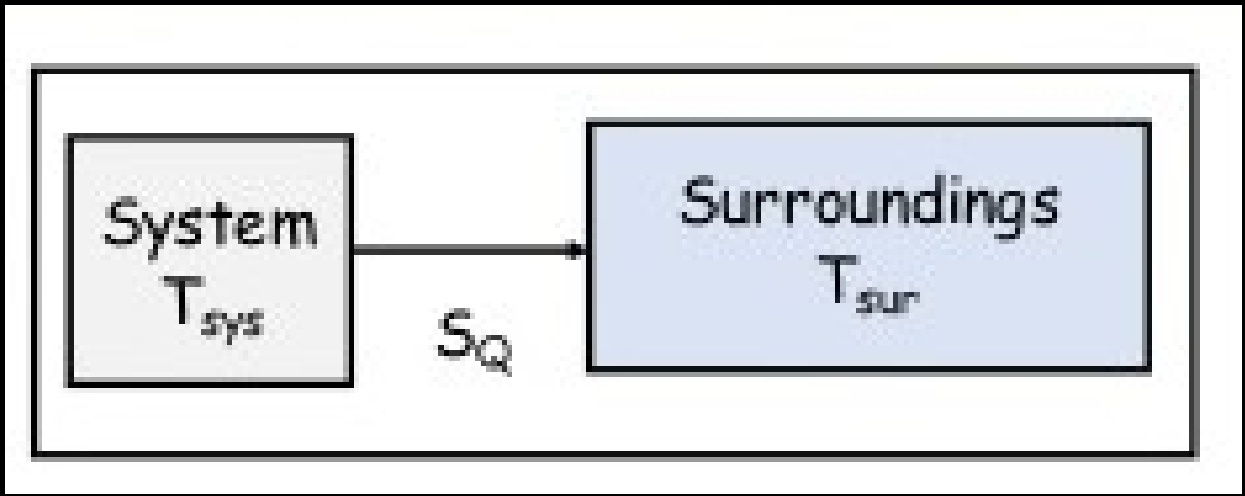


Příklad 3.1 Výpočet ΔS
pro expanzi id g za T=konst

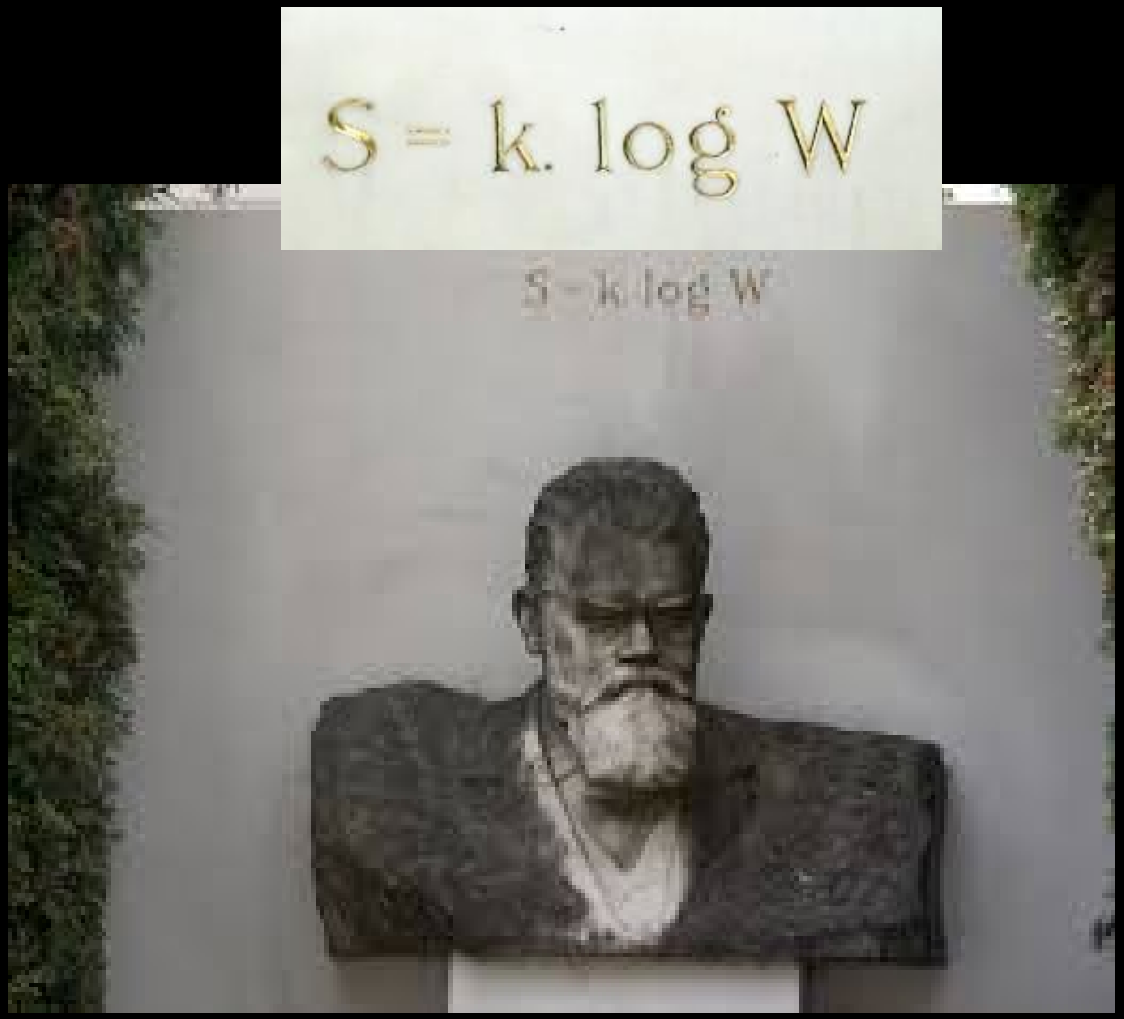




Změna S okolí,

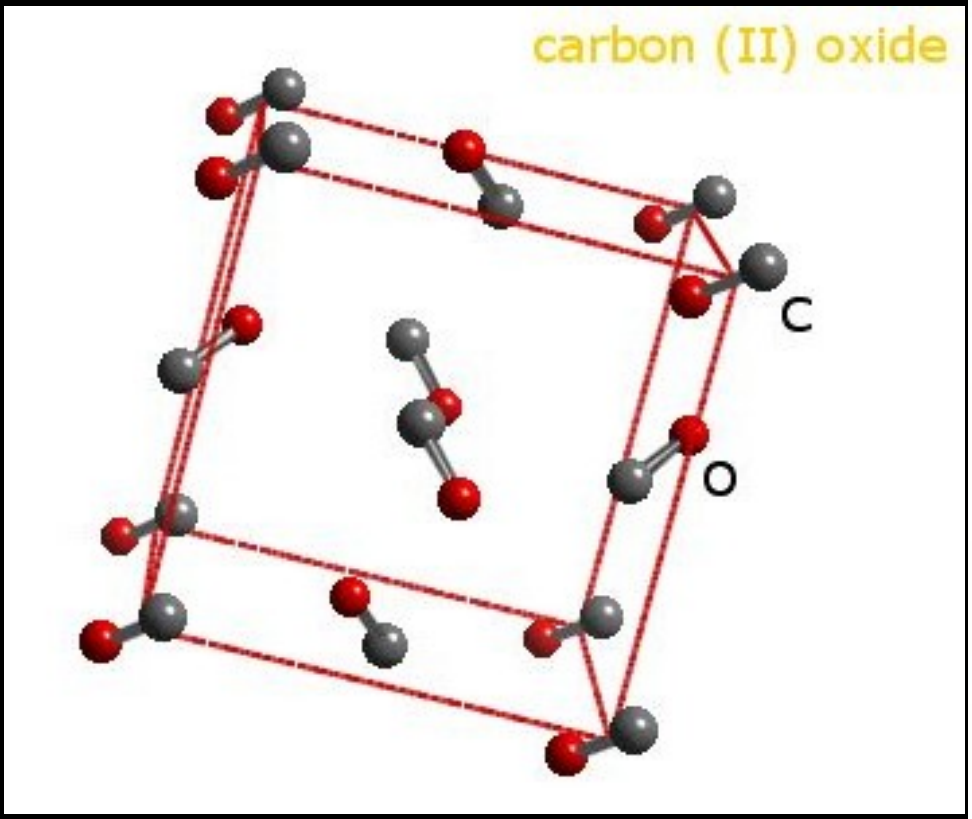


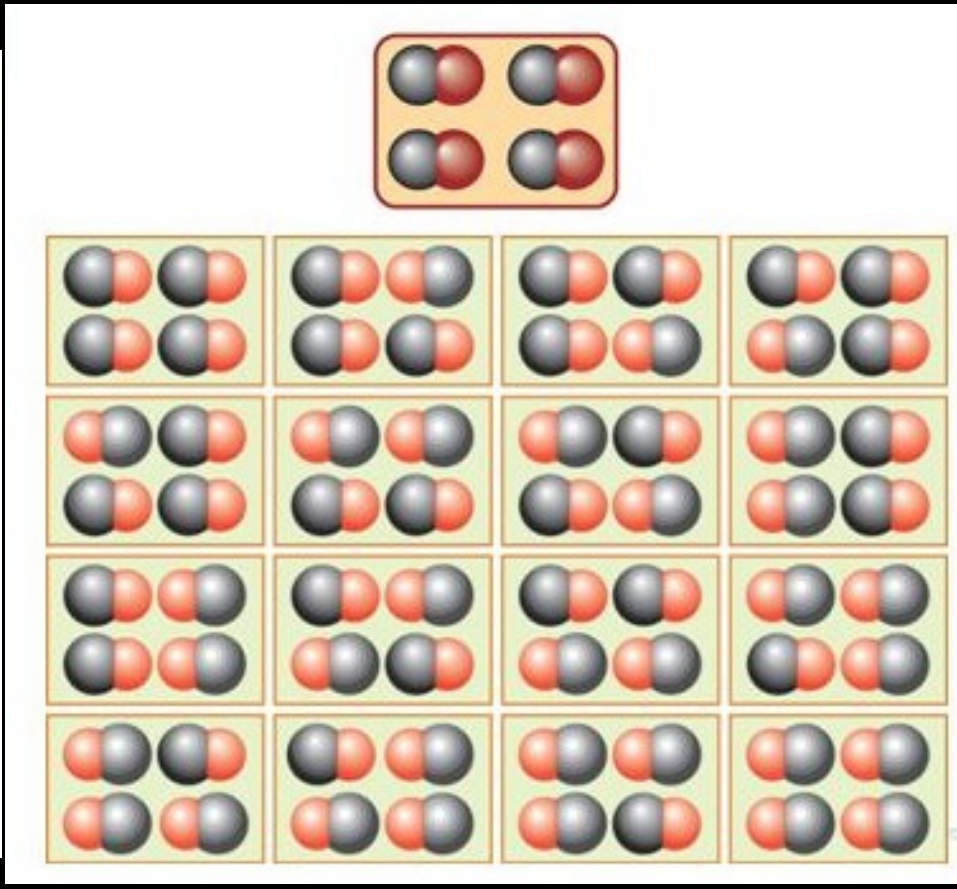
3.1.2.2 Statistický pohled na S



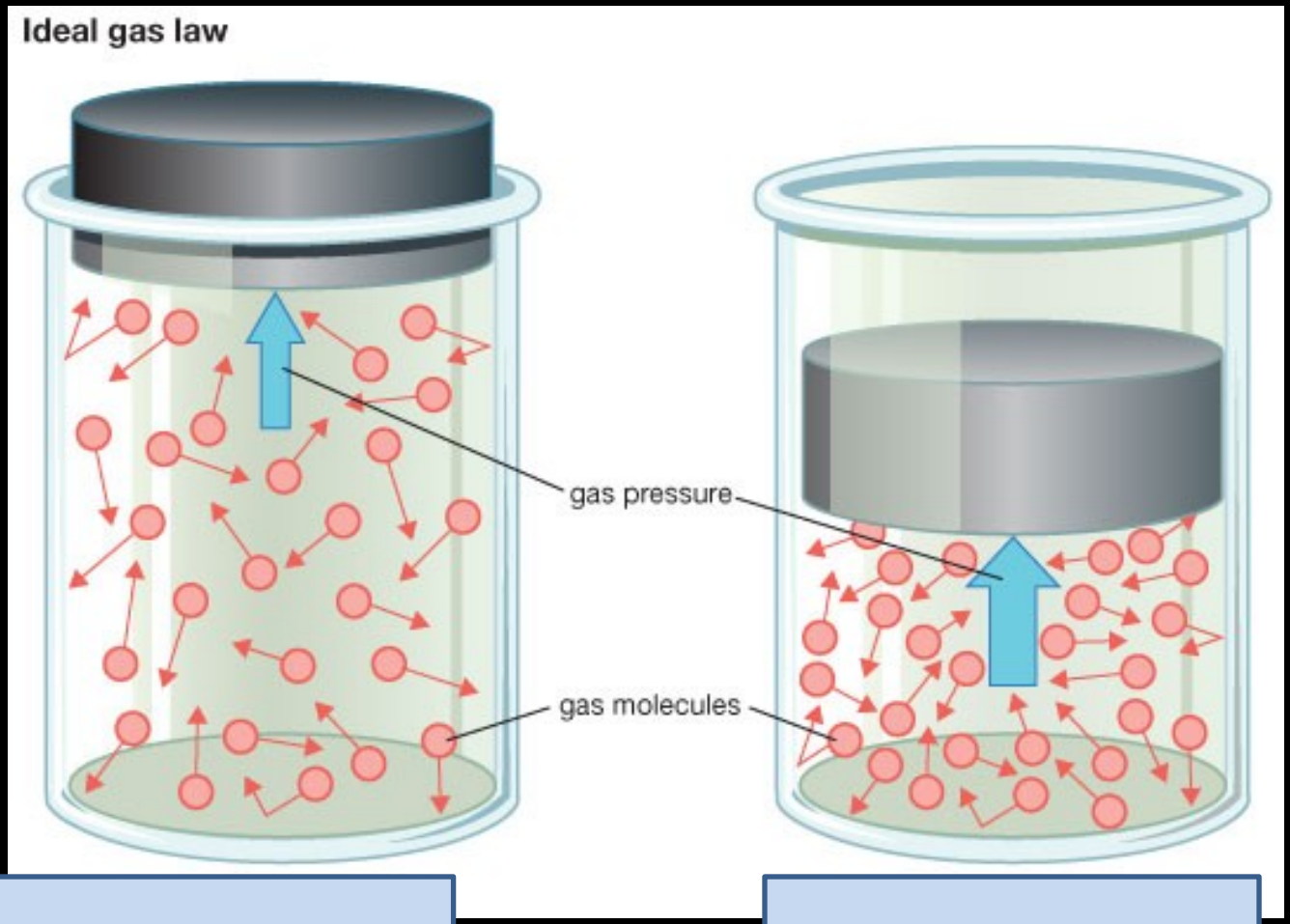
Ludwig Boltzmann, 1844-1906

Příklad: Entropie CO



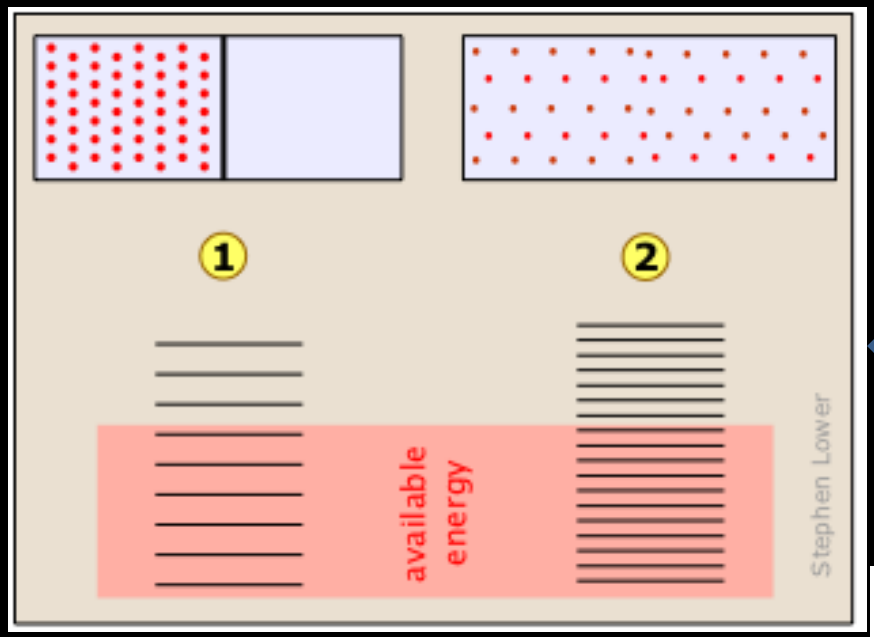


Ekvivalence S z TD ….



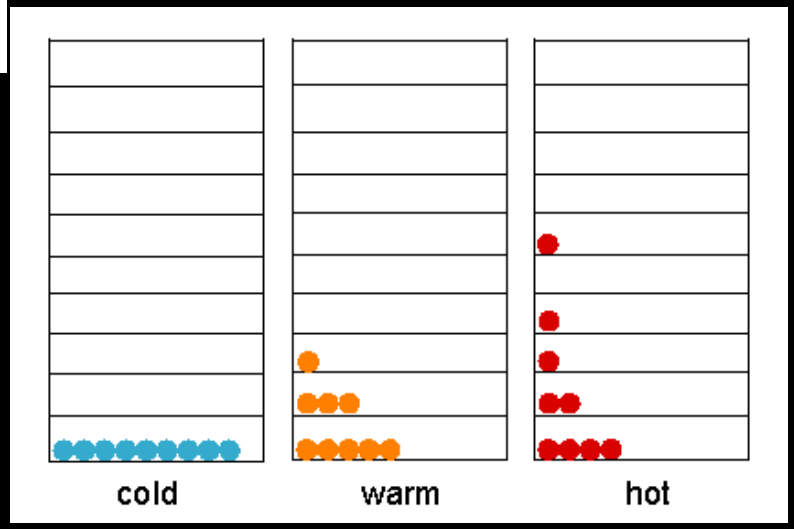
1 mol, $2V_1$,T ← 1 mol, V_1 ,T

...a statistiky,
aneb Boltzmannovské populace stavů



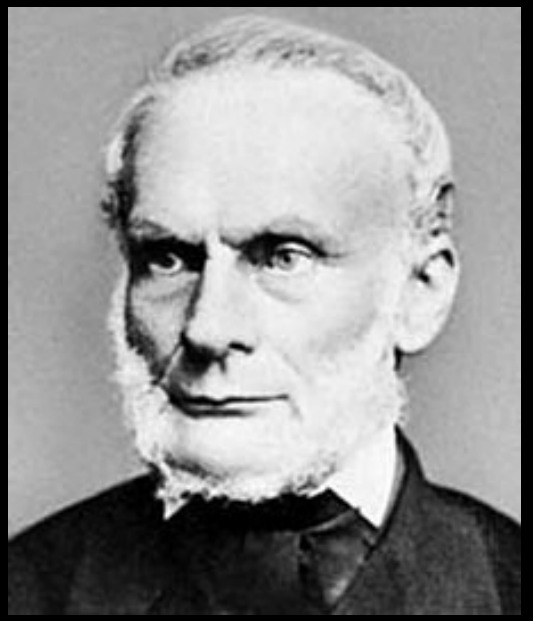
Vliv V, T=konst

Vliv T



3.1.2.5 Clausiova nerovnost

Entropie izolovaného systému
roste
nebo zůstává konstantní,
nemůže však klesat.



Rudolf Clausius, 1822-1888

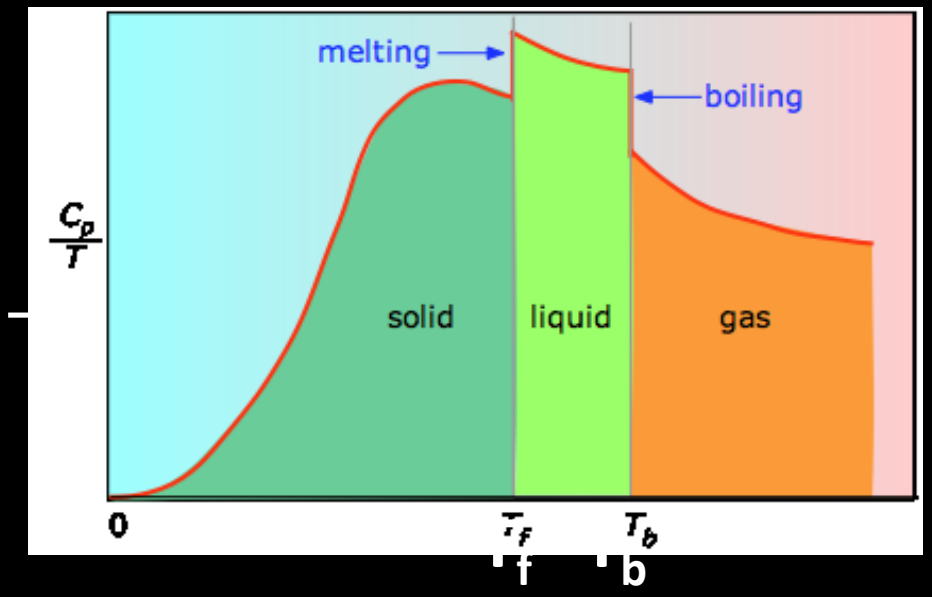
3.1.3.2 Fázový přechod

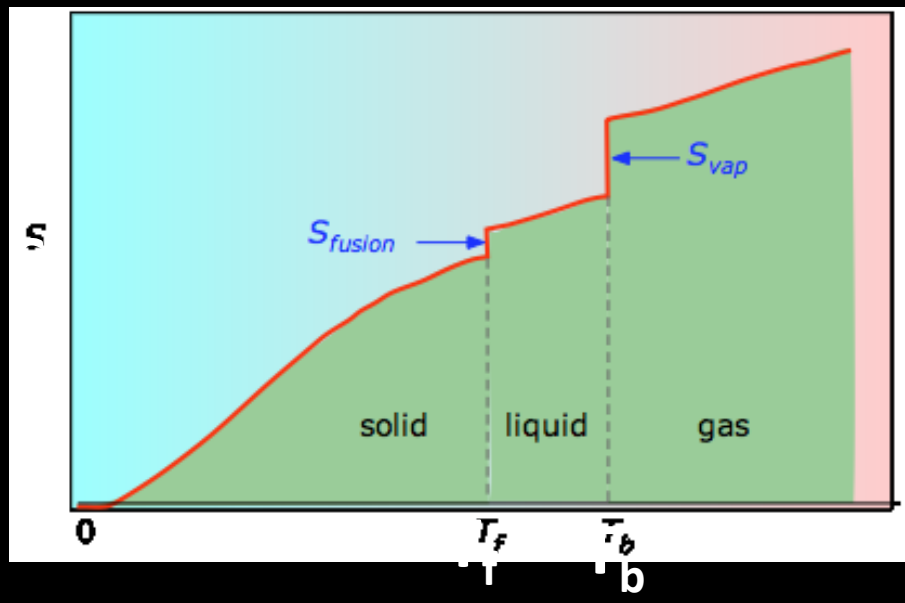
+

3.1.3.3 Ohřívání

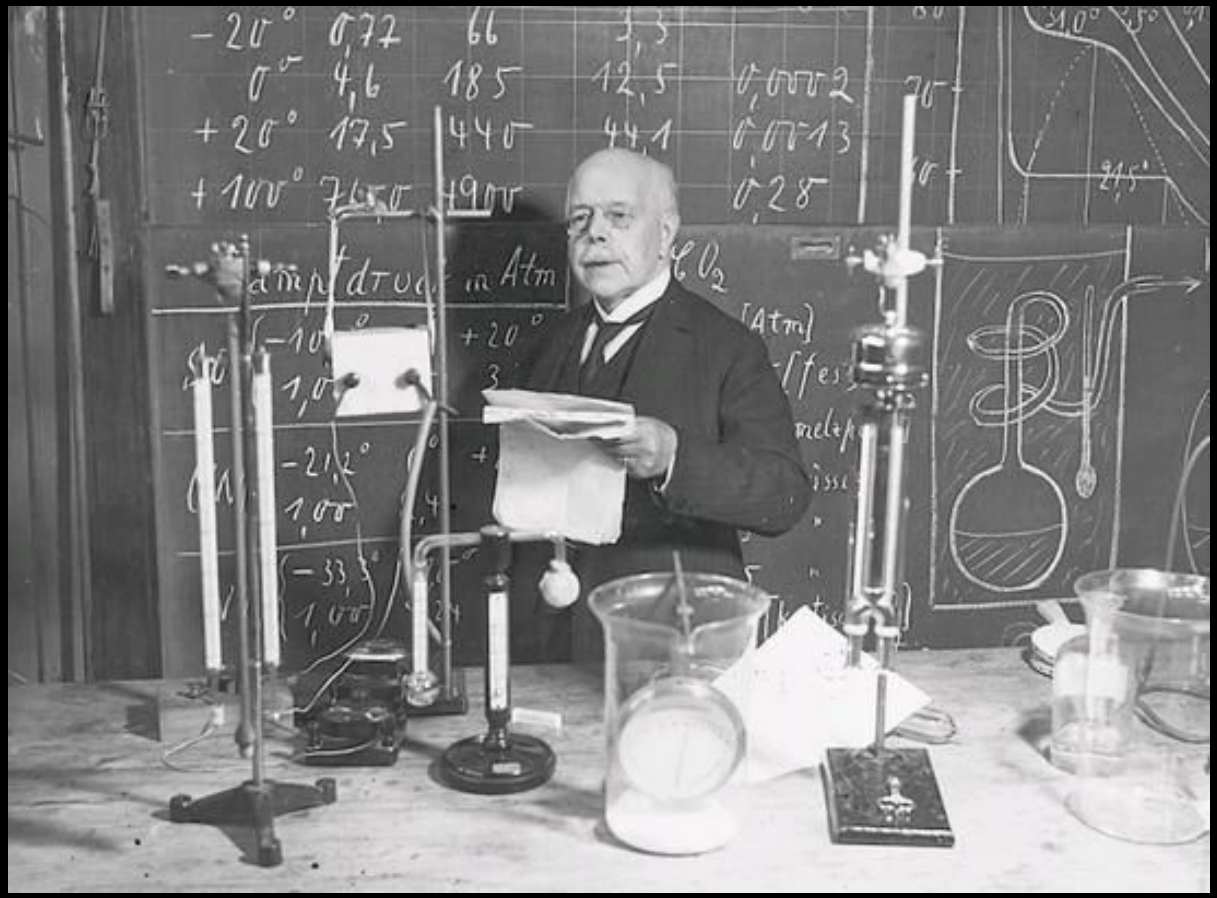
Samostudium Atkins

3.1.3.4 Závislost Cp/T na T a výpočet S(T)





3.1.4 Třetí zákon TD



Walter Nernst (1864-1941) | Winner of the Nobel Prize in Chemistry in 1920 “for his work in thermochemistry”.

Nernstův tepelný teorém

Při T [redacted] se [redacted] doprovázející jakoukoli fyzikální nebo chemickou přeměnu, blíží 0 za předpokladu dokonalého uspořádání molekul všech zúčastněných látek.