Basics in Science
WS 2022/23

Dr. Lars Birlenbach
Physikalische Chemie 1 (PC1)
Raum AR-F0102
Tel.: 0271 740 2817
eMail: birlenbach@chemie.uni-siegen.de

- Webseite zur Vorlesung (Folien, Übungsblätter):
- http://www.chemie.uni-siegen.de/pc/lehre/bis/

Zugangsdaten:
User: Ludwig
Passwort: Boltzmann

Berechnung von Puffersystemen

$$K_S = \frac{c(\mathrm{H}^+)c(\mathrm{S}^-)}{c(\mathrm{HS})} \qquad = c(\mathrm{H}^+)\frac{c(\mathrm{S}^-)}{c(\mathrm{HS})}$$

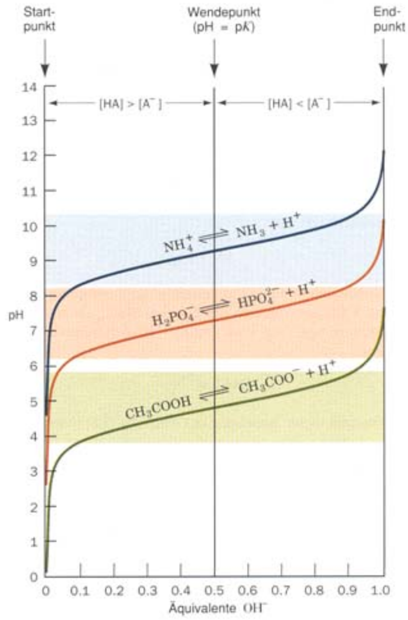
logarithmieren, dann mit -1 multiplizieren:

$$-\lg K_S = -\lg c(\mathrm{H}^+) - \lg\frac{c(\mathrm{S}^-)}{c(\mathrm{HS})}$$

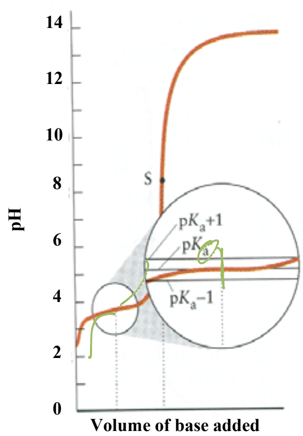
$$\mathrm{pK_S} = \mathrm{pH} - \lg\frac{c(\mathrm{S}^-)}{c(\mathrm{HS})} \qquad \mathrm{pH} = \mathrm{pK_S} + \lg\frac{c(\mathrm{S}^-)}{c(\mathrm{HS})}$$

$$\mathrm{pH} = \mathrm{pK_S} \text{ für } c(\mathrm{S}^-) = c(\mathrm{HS})$$

Pufferungskurven

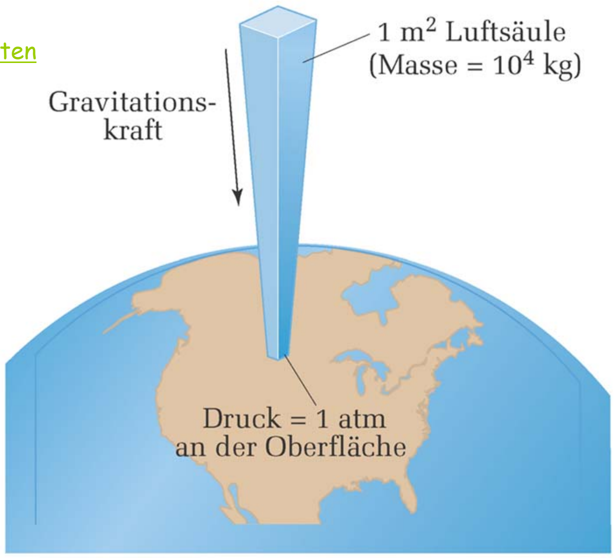


Eine Pufferlösung ist effektiv im Bereich pK_s ± 1



Gase

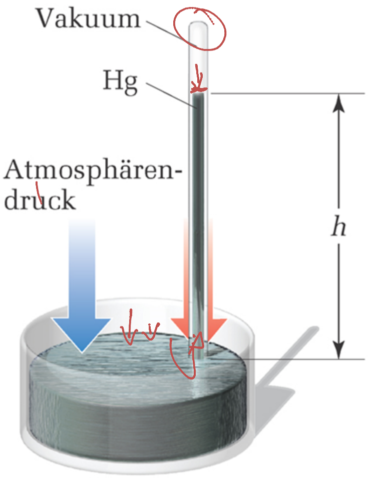
Gas im Kasten



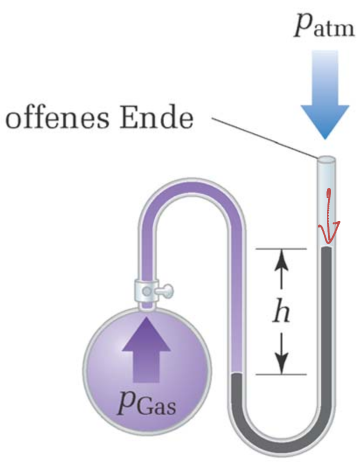
Abbildungen aus: Brown-LeMay, Chemie
siehe www.pearson-studium.de

Lars Birlenbach
birlenbach@chemie.uni-giessen.de

Barometer



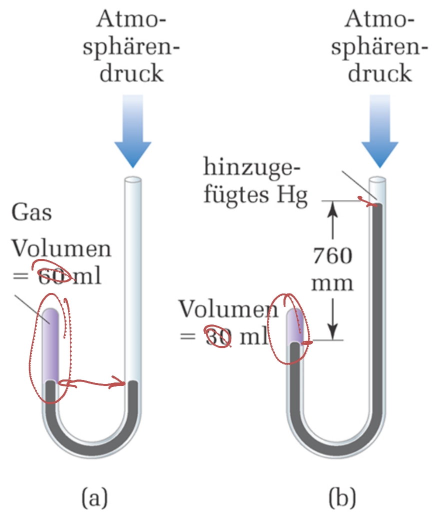
Manometer



$$p_{Gas} = p_{atm} + h$$

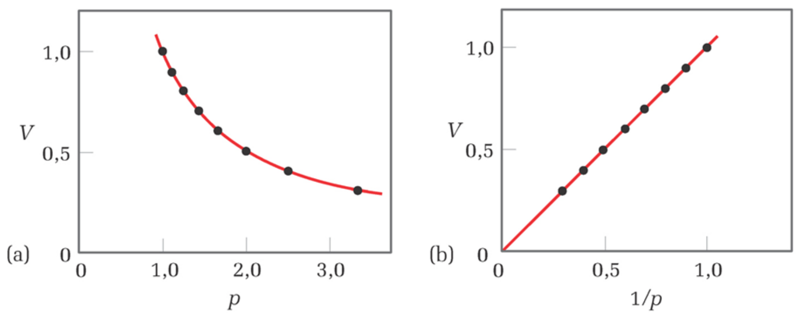
Lars Birlenbach
birlenbach@chemie.uni-giessen.de

Boyle-Mariottesches Gesetz



Lars Birlenbach
birlenbach@chemie.uni-giessen.de

Boyle-Mariottesches Gesetz (~1670)



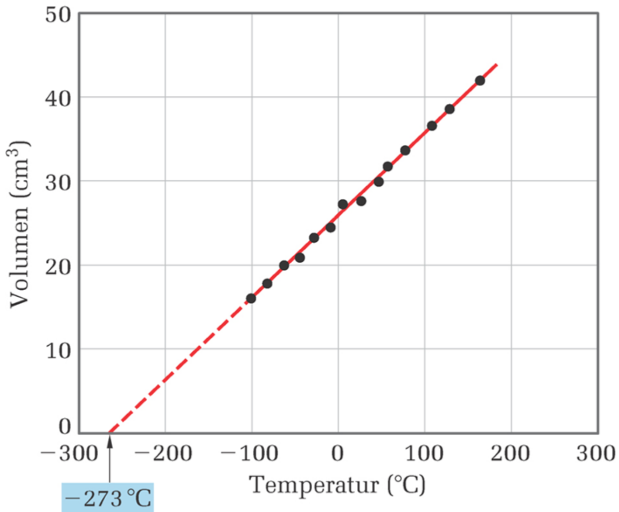
$$pV = const.\ \text{(Hyperbel)}$$

Lars Birlenbach
birlenbach@chemie.uni-giessen.de

Einfluss der Temperatur aufs Gasvolumen

Lars Birlenbach
birlenbach@chemie.uni-siegen.de

Gesetz von Gay-Lussac (~1800)



Abbildungen aus: Brown-LeMay, Chemie
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Lars Birlenbach
birlenbach@chemie.uni-siegen.de

$$V \propto T$$

$$V \propto 1/p$$

$$V \propto n$$

$$V \propto \frac{nT}{p}$$

ideales Gasgesetz

$$pV = nRT$$

Partialdruck

- Partialdruck: Druck einer einzelnen Komponente in einer Gasmischung

$$p_i = x_i \cdot p$$

$$p_1V = n_1RT \qquad p_2V = n_2RT \qquad p = p_1 + p_2$$

Dichte ϱ (rho) von Gasen und molare Masse

$$pV = nRT$$

$$n = \frac{m}{M}; \qquad pV = \frac{m}{M}RT$$

$$pV = \frac{m}{M}RT; \qquad \rho = \frac{m}{V};$$

$$p = \frac{mRT}{VM} = \frac{\rho RT}{M}$$

$$M = \frac{\rho RT}{p}$$

Lars Birlenbach
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Dichte verschiedener Gase

	He	N_2	CH_4
Volumen	22,4 l	22,4 l	22,4 l
Druck	1 atm	1 atm	1 atm
Temperatur	0 °C	0 °C	0 °C
Gasmasse	4,00 g	28,0 g	16,0 g
Anzahl der Gasteilchen	$6{,}02 \times 10^{23}$	$6{,}02 \times 10^{23}$	$6{,}02 \times 10^{23}$

Lars Birlenbach
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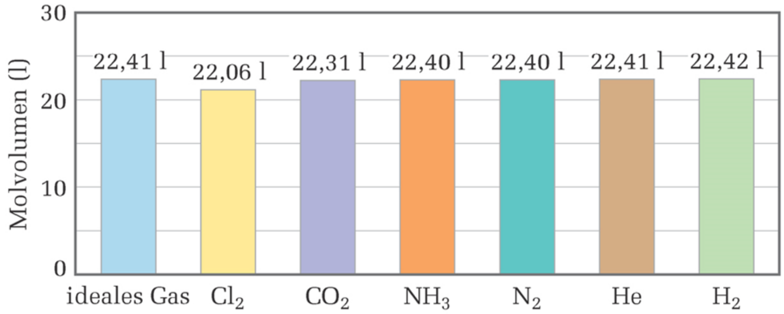

Lars Birlenbach
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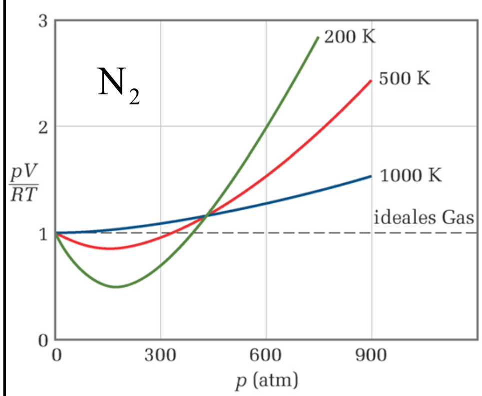
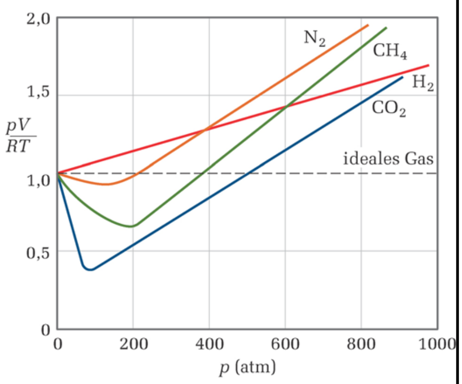
Abweichungen vom idealen Verhalten





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