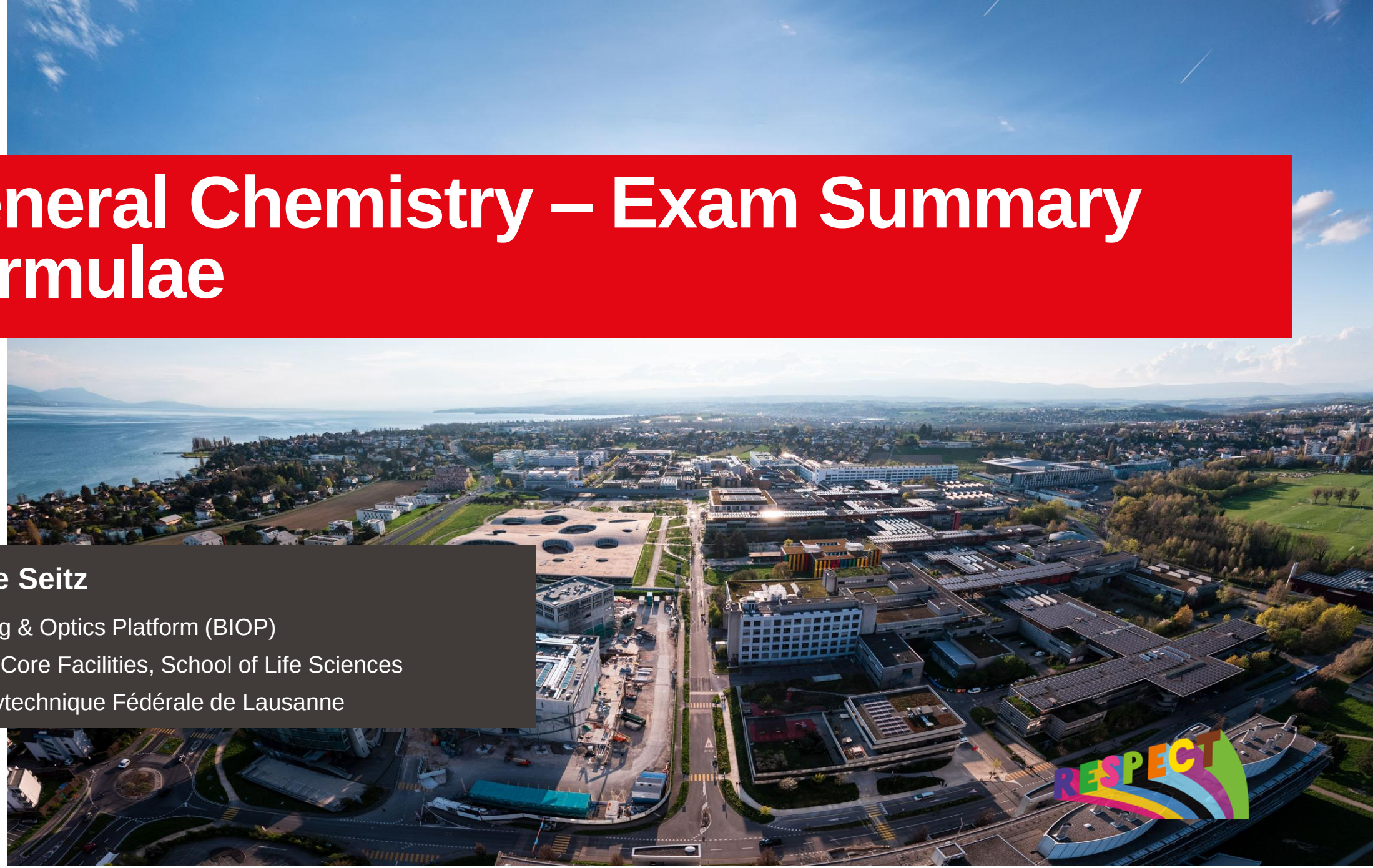
General Chemistry – Exam Summary Formulae



Dr. Arne Seitz

BioImaging & Optics Platform (BIOP)

Research Core Facilities, School of Life Sciences

École Polytechnique Fédérale de Lausanne

- Ideal gas law

$$\mathrm{P} \cdot V = n \cdot R \cdot T$$

$$\frac{P_1 \cdot V_1}{n_1 \cdot T_1} = \frac{P_2 \cdot V_2}{n_2 \cdot T_2}$$

- Kinetic Model of Gases

$$v_{\mathrm{rms}} = \left(\frac{3RT}{M}\right)^{\frac{1}{2}}$$

- First law of Thermodynamics

$$\Delta U = q + w$$

- Expansion

$$w = -p_{ex}\Delta V$$

- Isothermal reversible expansion

$$w = -nRT\ln\frac{V_2}{V_1}$$

- Heat Capacity

$$C = \frac{q}{\Delta T}$$

- Enthalpy

$$H = U + P \cdot V$$

- Heat capacity of gases

	Atoms	Linear Molecules	Nonlinear Molecules
$C_{V,m}$	(3/2)*R*	(5/2)*R*	3*R*
$C_{P,m}$	(5/2)*R*	(7/2)*R*	4*R*

- Standard reaction enthalpies

$$\Delta H° = \Sigma n\, \Delta H_f^{\circ}(\text{products}) - \Sigma n\, \Delta H_f^{\circ}(\text{reactants})$$

- Entropy

$$\Delta S = \frac{q_{rev}}{T}$$

- Gibbs Free energy

$$\Delta G = \Delta H - T\Delta S$$

$$\Delta G = \Sigma n G_m\,(\text{products}) - \Sigma n G_m\,(\text{reactants})$$