# 4. Exercise General Chemistry 16.11.2022

## WS 2022/23

### 4.1

Nitrosyl chloride decomposes in the gas phase to NOCl NO + ½ $Cl_2$. At 180° C, the following NOCl values for partial pressure are found as a function of time:

| $t$/s | 0 | 500 | 1000 | 1500 | 2000 | 2500 |
|---|---|---|---|---|---|---|
| $p$/Torr | 500 | 413 | 351 | 306 | 271 | 243 |

Does the decay occur after a 1st or 2nd order reaction? Determine the reaction rate constant.

### 4.2

The half-life time of a 0th order gas reaction is 1 s at a pressure of 0.1 bar. Calculate the reaction rate constant.

### 4.3

For a reaction, the following reaction rate constants are determined as a function of the temperature:

| $t$/°C | 25 | 35 | 45 | 55 |
|---|---|---|---|---|
| $k$/$s^{-1}$ | 1 | 1,30 | 1,66 | 2,09 |

Calculate the activation energy.

### 4.4

Let the constant $K_p$ for the gas reaction A + B ↔ 2C be $1 \cdot 10^{-8}$. In a reaction vessel A and B have the partial pressures without reaction 1 bar each. What is the partial pressure of C at equilibrium? The use of approximations allows the calculation to be carried out very simply.

### 4.5

A saturated iodine solution in water contains 0.33 g iodine / L. In a potassium iodide solution more iodine can be dissolved because of
the reaction $I_2$ I $I_3$

.

A 0.1 M potassium iodide solution dissolves 12.5 g of iodine / L. Calculate the equilibrium constant. What effect has a water addition to a saturated solution of $I_2$ in KI solution?