5. Exercise General Chemistry 03.12.2023

WS 2023/24

5.1

How many different structural formulas are compatible with C_6H_{14}? formula? Draw these structural formulas.

5.2

5g $SiCl_4$ contain 0.8265g Si. Determine the molar mass of Si on the assumption that the molar mass of chlorine is known.

5.3

A compound consists of 85.62% carbon and 14.38% hydrogen by weight. Which molecular formulas can be used for the compound? Which compound is it if you also know the boiling point of 81 °C?

5.4

Complete and balance the following reaction equations:

$I_2 + H_2S \rightarrow S + I^-$

$Zn + NO_3^- \rightarrow NH_4^+ + [Zn(OH)_4]^{2-}$ (alkaline)

$PbO_2 + HI \rightarrow PbI_2 + I_2$

$H_2O_2 + MnO_4^- \rightarrow Mn^{2+}$

$C_2H_5OH + MnO_4^- \rightarrow CH_3CHO + Mn^{2+}$

$H_2S + SO_2 \rightarrow S$

$PbO_2 + Cl^- \rightarrow ClO^- + [Pb(OH)_3]^-$ (alkaline)

$ClO^- \rightarrow ClO_3^- + Cl^-$

$HClO_2 \rightarrow ClO_2 + ClO_3^- + Cl^-$ $ClO_3^- : Cl^- = 1 : 1$

$NO + NO_3^- \rightarrow N_2O_4$

5.5

What mass of oxygen do you need to completely burn 10 g of anthracene-9,10-dicarboxylic acid?

5.6

100 g hexane and 10 g oxygen are placed in a reaction vessel. Determine the composition of the end product in % by weight, assuming that only carbon dioxide and water are to be formed as oxidation products.

5.7

10 ml of 1 M H_2SO_4 and 15 ml of 0.5 M $BaCl_2$ solution are combined. Calculate the mass of the precipitate and the concentrations in the solution. Assume the solubility product of $BaSO_4$ as zero.