

Exercises 5

- 1 What does electronegativity mean? What consequences does it have, if...
 - a) two elements in a compound A-B have very different electronegativities.
 - b) two elements in a compound A-B are of equal electronegativity
- 2 What is a chemical reaction? Try to give a very general definition. Give an example for a chemical reaction and another one for a process which is not.
- 3 What does the double arrow indicate in the symbolic representation of a chemical reaction? Give an example.
- 4 Name an example for a chemical reaction that can be used as an energy source.
- 5 Try to define an oxidation reaction. What is the key step in an oxidation reaction? Name an example.
- 6 Which of the following reactions can be considered to be classical acid-base reactions which do definitely not belong to this category?*

 - a) $\text{Cu}^{2+} + \text{Zn} \rightarrow \text{Cu} + \text{Zn}^{2+}$
 - b) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
 - c) $\text{HCl} + \text{H}_2\text{O} \rightarrow \text{Cl}^- + \text{H}_3\text{O}^+$
 - d) $\text{HF} + \text{I}^- \rightarrow \text{HI} + \text{F}^-$
 - e) $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$

- 7 Oxidation reactions and reduction reactions are often connected to each other as simultaneous processes. Give a reason for this observation and name an example for such a (so called) redox-reaction.
- 8 Which pH-value would you detect on a solution which contains H_3O^+ -ions at a concentration of 10^{-5} mol/L. How would you characterize its state? How could you change the state of the solution back to neutral?
- 9 Assume you are looking for a chemical reaction which could serve as a source of heat energy. Which conditions regarding the characteristics of the reaction have necessarily to be fulfilled?
 - a) The reaction has to be an equilibrium reaction
 - b) The reaction has to be connected to an oxidation process
 - c) The reaction has to be connected with a negative change of the enthalpy
 - d) The reaction has to be connected with a positive change of the enthalpy
 - e) The reaction has to be connected to a volume expansion
 - f) The reaction has to be connected to the emission of light

* One or several answers may be correct. Please indicate appropriately by repeating the assignments a), b), c), ... followed by the statements "right" or "wrong" on your answer sheet.