

General Chemistry for ISE students

C. Mayer

Winter Sem. 2012 / 2013

Lectures: Monday 10:00 – 12:00, ST025
Exercises: Monday 12:00 – 13:00, ST025
First lecture on Monday, October 15th 2012
Last lecture on Monday February 4th 2013

Contents:

- 1 Introduction**
Properties of the electron,
the single most important elementary particle in chemistry
- 2 The Atom**
Complexity and reliability of atomic models
- 3 The Periodic System**
Efforts to put order into the variety of chemical elements
- 4 Chemical Bonds**
How elements interact with each other and form compounds
- 5 Chemical Reactions**
How chemical bonds form and rearrange; important types of chemical reactions, chemical equilibrium, acids and bases, redox reactions
- 6 Chemical Thermodynamics and Kinetics**
Energy exchange, driving force and velocity of chemical reactions
- 7 Materials: Relations between Structures and Properties**
Basic question: how do chemical structures determine the macroscopic properties of materials?
 - 7.1 Important material properties
 - 7.2 Metals
 - 7.3 Polymers
 - 7.4 Ceramics

Rehearsals for final examination (written exercises), questions and answers.

For related material see <http://www.relaxation.chemie.uni-duisburg-essen.de/en/lehre.php> . Here you will find (under “scripts and lecture notes”) the heading “ISE – International Studies of Engineering” followed by the icon “recommended reading” and links to material for all chapters of the lecture.

General Chemistry for ISE Students - Recommended reading

- 1) **General Chemistry** (English) ←first choice!
by Peter W. Atkins (New York 1989)
accessible in the library under code: 32UNP2386
- 2) **Chemie – einfach alles** (German)
by Peter W. Atkins and J.A. Beran (Weinheim 1996)
accessible in the library under code: 32UNP2653
- 3) **General Chemistry** (English)
by Wendell H. Slabaugh and Tharan D. Parsons (New York 1976)
accessible in the library under code: 31UNP1453
- 4) **Prinzipien der Chemie** (German)
by Dickerson, Gray and Haight (Berlin 1978)
accessible in the library under code: 31UNP1762
- 5) **Basic Principles of Chemistry** (English)
by Harry B. Gray and Gilbert P. Haight (New York 1967)
accessible in the library under code: 33UNP1259

Even though the lecture does not closely follow the contents of these books, they may serve as an additional source of understanding. In general however, you should be able to pass the final exam just based on your lecture notes and the additional material offered on the homepage (see above).

If problems occur, my E-mail address is christian.mayer@uni-due.de