

Physical Chemistry II: Electrochemistry, Chemical Kinetics (C003079)

Course size (nominal values; actual values may depend on programme)
 Credits 5.0 Study time 150 h Contact hrs 72.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	Dutch	practicum	40.0 h
		seminar: coached	10.0 h
		exercises	
		lecture	22.5 h

Lecturers in academic year 2018-2019

Strubbe, Katrien WE06 lecturer-in-charge

Offered in the following programmes in 2018-2019

Bachelor of Science in Chemistry	crdts	offering
	5	A

Teaching languages

Dutch

Keywords

Ionic solutions, electrode potential, electrochemical equilibrium, chemical kinetics, rate of reaction, rate law, reaction mechanism

Position of the course

This course contains two parts.

Part1 follows on the course "Physical chemistry I" en discusses the thermodynamics of ionic solutions and equilibrium in the case charged particles are involved.

Part 2 discusses the basic concepts of chemical kinetics

Contents

Di-electrical behaviour of matter
 Arrhenius theory, Debye Hückel theory
 Influence of ionic strength upon equilibria
 Reversible electrodes, equilibrium potential of an electrochemical cell
 Standard electrode potentials
 Empirical chemical kinetics
 Chemical kinetics and reaction mechanism, catalysi
 Corrosion: principles
 Rate of electrode reactions

Initial competences

The students have a credit for "Physical Chemistry: thermodynamics or have acquired the knowlegde and competencies in other courses (to be shown by means of credits)

Final competences

- 1 To have insight into the fundamental concepts of chemical thermodynamics of electrolyte solutions and equilibrium electrochemistry.
- 2 To know the theories which explain the experimental behavior of electrolyte solutions.
- 3 To have insight in the factors which determine the equilibrium potential at an electrode.
- 4 To have insight in the construction and principles of an electrochemical cell and het applications.
- 5 To know and be able to apply basic concepts of chemical kinetics.
- 6 To have insight in the factors that determine rate and mechanism of chemical reactions.
- 7 To know how to incorporate and evaluate experimental results concerning the rate of

chemical reactions.

- 8 Be able to set up and perform an experiment in Physical chemistry under guidance and to evaluate the experimental results.
- 9 Be able to communicate about simple chemical problems with peers.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, microteaching, practicum, self-reliant study activities, seminar: coached exercises

Extra information on the teaching methods

Practical exercises: carry out exercises, to develop (under guidance) an experimental setup for a simple problem

Microteaching: to guide fellow students during the seminars

Seminars: application of the learning material

independent work: to translate a specific part of the course in a simulation

Learning materials and price

Syllabus (Dutch) 10 Euro

Reference boek (English)

Documents on Minerva

References

"Electrochemistry": C.H. Hamann, A. Hamnet, W. Vielstich, Wiley-VCH, Weinheim (1998)

Course content-related study coaching

Possibility for personal explanation by the lecturer or assistant (on appointment)

Interactive support by ELO (forum)

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions, oral examination

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions, oral examination

Examination methods in case of permanent evaluation

Open book examination, participation, skills test, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

Theory: Oral with written preparation, testing of knowledge and insight in the subject matter (see contents)

Exercises: testing whether the concepts can be used for solving concrete problems

Practical exercises: evaluation of attitude during the exercises, evaluation of the written report, testing of the knowledge of the experiments

microteaching: evaluation of preparation/presentation of a limited part of the contents

The student who does not participate, or who is absent without an official reason of the non-periodic evaluation (microteaching, examinations, laboratory sessions) will receive a score that will not allow the student to succeed

Calculation of the examination mark

Theory (60 %)

Exercises (including microteaching)(25 %) + Practical exercises (15 %)