

Course: Electrochemistry

credits: 5

Course code CHVP23ELEKTROCHM
Name Electrochemistry
Study year 2026-2027
ECTS credits 5
Language Dutch, with parts in English
Coordinator L.A. van Vliet

Modes of delivery Assignment
 Lecture
 Practical / Training
 Project-based learning
 Teaching method 1

Assessments Elektrochemie Theorie - Written, organised by STAD examinations
 Project Zonnecellen - Other assessment

Learning outcomes

This module has the following learning outcomes:

- You formulate the principles of electrochemistry, set up (complex) semi-reactions and explain the occurrence or non-occurrence of redox reactions in acidic, basic or neutral environments.
- You understand the composition and operation of Galvanic cells and calculate cell voltages using the Nernst equation. You apply this to batteries and fuel cells.
- You perform equilibrium calculations on redox, precipitation and complex formation reactions.
- You explain the influence of poorly soluble salts, complex ions and buffers on electrode potentials and determine the respective K, K and K from measured cell voltages.
- You work on a project on solar cell concepts and principles, such as representing, naming and calculating solar cell components.
- You apply theoretical knowledge about electrochemistry in an independent, safe and responsible way while carrying out a simple experiment and communicate about this via a logbook and/or results form according to the applicable guidelines.
- You reflect on the study progress and study experience by means of a portfolio and a final personal interview with the mentor and make a planning for the next school year. (PI = personal identity; PD = personal development).

DAS competencies

Competency	Level (I-IV)
Research	I
Experimentation	I
Development	
Management	
Advise	
Instruction	
Leadership	
Self-management	I

Content

This module focuses on several applications of electrochemistry. We start by refreshing high school knowledge: what is a reductor and oxidiser and when does a redox reaction occur? Then you learn to derive half-reactions for complex oxidisers and reductors. We discuss in detail Galvanic cells and their practical application: batteries and fuel cells. Using Nernst's law, you learn to calculate the voltage given by a battery.

In the second half of this module, we continue calculating saturated solutions (K_{sp}) and solution containing a complex ion (K_f) and we calculate the acid dissociation constant (K_a) using electrochemical reactions. Theory will also cover the solar cell project.

In practicals, you apply theory with the performance of basic electrochemical experiments, the construction of a galvanic cell and a solar cell project.

For professional identity, you will write a portfolio and conduct a final interview with your tutor.

It is desirable to have taken the modules Chemical Calculus, Chemical Equilibria and Chemical Bonding.

Included in programme(s)

Chemistry

School(s)

Engineering, Life Sciences & ICT

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