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 (Ksp) and solution containing a complexion (Kf) and we calculate the acid dissociation constant (Ka) 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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