



Vaste stof chemie (C002562)

Wegens Covid19 kan mogelijk afgeweken worden van de onderwijs- en evaluatievormen. Dergelijke afwijkingen zullen via Ufora worden gecommuniceerd.

Cursusomvang (nominale waarden; effectieve waarden kunnen verschillen per opleiding)

Studiepunten 6.0 Studietijd 150 u Contacturen 57.0 u

Aanbodsessies en werkvormen in academiejaar 2020-2021

A (semester 1) Engels Gent hoorcollege 27.5 u

Lesgevers in academiejaar 2020-2021

Van Driessche, Isabel	WE06	Verantwoordelijk lesgever
Hens, Zeger	WE06	Medelesgever
Van Der Voort, Pascal	WE06	Medelesgever

Aangeboden in onderstaande opleidingen in 2020-2021

	stptn	aanbodsessie
Educatieve Master of Science in de wetenschappen en technologie (afstudeerrichting chemie)	6	A
Master of Science in Chemistry	6	A

Onderwijstalen

Engels

Trefwoorden

Solid state chemistry, synthesis, physical and chemical properties, chemistry of surfaces, analysis techniques

Situering

Solid state chemistry is one of the major courses of the master in chemistry program. It is based on a number of courses taught at the bachelor level like chemical thermodynamics and crystallography. The course makes up a starting point for a number of optional courses in the master program. The course gives an overview of solid state chemistry starting with the crystalline structure of solids and finishing with the applications of solids in chemistry. It aims at giving students an understanding in the physical and chemical properties of solids and the solid surface and in the analysis of solid state properties.

Inhoud

1. Crystal structures - overview of crystal structures, closed packed structures, common crystals structures of compounds, defects.
2. Synthesis of solids.
3. Chemical bonding in solids - tight-binding approximation, energy bands, trends in the electronic structures, ionic solids.
4. Physical properties - electrical properties, interaction with light, magnetic properties, thermal properties, mechanical properties.
5. Semi-crystalline and amorphous materials - silica, zeolites.
6. The solid surface - gas adsorption, adsorption-isotherms.
7. Solid state characterization techniques

Begincompetenties

- General chemistry and physics courses at the bachelor level.
- fysische chemie I: chemische thermodynamica.
- kristallografie.
- kwantum chemie.

Eindcompetenties

- 1 The students are able to calculate pore area, pore volume, pore size distribution, micro- and mesopore volume and recognize the pore shape, using the raw data of a nitrogen adsorption-desorption isotherm.

- 2 Students know the evolution of the development of ordered porous materials since the 1950s, including zeolites, zeotypes, clays, templated silicas, organosilicas, Metal-Organic Frameworks and Covalent Organic Frameworks.
- 3 Students have a thorough understanding of the crystal structures of solids.
- 4 Students understand and are able to interpret phase diagrammes of solid materials.
- 5 Students have a deep understanding of the electronic properties of materials, including optical and electrical properties.
- 6 Students have a deep understanding of selected solid state characterization techniques, c.g. Fourier Transform Infrared Spectroscopy and its solid state sampling techniques (DRIFTS, ATR) and electron microscopy (SEM, TEM).
- 7 Students are aware of the fast progress made in this recent field and will keep an eye on major breakthroughs in the field of solid state chemistry.
- 8 Students understand how solid state applications can attribute to the goals of Green and Sustainable Chemistry, by heterogeneous catalysis, energy storage, gas storage and luminescence.

Creditcontractvoorwaarde

Toelating tot dit opleidingsonderdeel via creditcontract is mogelijk mits gunstige beoordeling van de competenties

Examencontractvoorwaarde

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

Didactische werkvormen

Hoorcollege, hoorcollege: plenaire oefeningen

Toelichtingen bij de didactische werkvormen

omwille van COVID19 kunnen gewijzigde werkvormen uitgerold worden indien dit noodzakelijk blijkt

Leermateriaal

English language course book. Geraamde totaalprijs: 15 EUR

Referenties

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Vakinhoudelijke studiebegeleiding

Interactive support by means of Ufora. Possibility for questions and discussions following each classroom lecture.

Evaluatiemomenten

periodegebonden evaluatie

Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijk examen met open vragen, openboekexamen, werkstuk

Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijk examen met open vragen

Evaluatievormen bij niet-periodegebonden evaluatie

Tweede examenkans in geval van niet-periodegebonden evaluatie

Examen in de tweede examenperiode is mogelijk

Eindscoreberekening

The parts refer to the sectioning in the course content

Part 1-2 - 30%

Part 3-4 - 35%

Part 5-6 - 35%