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| <b>Modulbezeichnung:</b> Interface phenomena (CME4)<br>(Interface phenomena) | <b>15 ECTS</b>   |                              |
| Modulverantwortliche/r:  | Rainer Fink  |                              |
| Lehrende:  | Christian Papp, Hubertus Marbach, Rainer Fink, Andreas Görling, Jörg Libuda, Christian Neiß, Bernd Meyer |                              |
| Startsemester: SS 2019   | Dauer: 2 Semester  | Turnus: halbjährlich (WS+SS) |
| Präsenzzeit: 195 Std.  | Eigenstudium: 255 Std.   | Sprache: Englisch            |

### Lehrveranstaltungen:

#### **A. Two units per 2L + 1S from the offers A1 - A4 chosen by the student:**

One of the two units can be replaced by an equivalent interdisciplinary course with the total of 5 ECTS out of the research field of „Interface-controlled processes“ in other departments:

A5: Surface Physics

A6: Physics of Nanostructures

A7: Special Courses from Theoretical Solid State Physics

A8: Nanotechnology of disperse systems

A9: Nanoscale surface characterization and structures

or related courses from the „Catalysis“ or „Molecular Nanoscience“ modules.

#### **A1: Organic Thin Films**

Organic Thin Films (WS 2019/2020, Vorlesung, 2 SWS, Rainer Fink)

Seminar Organic Thin Films (WS 2019/2020, Seminar, 1 SWS, Rainer Fink et al.)

#### **A2: Symmetry and Group Theory**

Symmetry and Group Theory (WS 2019/2020, Vorlesung, 2 SWS, Jörg Libuda)

Seminar Symmetry and Group Theory (WS 2019/2020, Seminar, 1 SWS, Jörg Libuda et al.)

#### **A3: Modern Techniques in Surface Science**

Modern Techniques in Surface Science (SS 2019, Vorlesung, 2 SWS, Christian Papp et al.)

Seminar Modern Techniques in Surface Science (SS 2019, Seminar, 1 SWS, Christian Papp et al.)

#### **A4: Specialization Lecture from Theoretical Chemistry or Computational Chemistry (Quantum Chemistry I, Modelling catalytic processes, Theory of Surface Phenomena)**

Quantum Chemistry I / Quantenchemie I (WS 2019/2020, Vorlesung, 2 SWS, Andreas Görling)

Quantum Chemistry I - Exercises / Übung zur Quantenchemie I (WS 2019/2020, Übung, 1 SWS, Jannis Erhard et al.)

Modeling of Catalytic Processes (SS 2019, Vorlesung, 2 SWS, Bernd Meyer)

Modeling of Catalytic Processes (Praktikum) (SS 2019, Praktikum, 2 SWS, Bernd Meyer et al.)

Theory of surface phenomena / Theorie der Oberflächenphänomene (WS 2019/2020, Vorlesung, 2 SWS, Bernd Meyer)

Exercise course Theory of surface phenomena / Übung zu Theorie der Oberflächenphänomene (WS 2019/2020, Übung, 1 SWS, Bernd Meyer)

#### **B. Lab Course Interface phenomena, projects in one of the IZ-ICP research groups (P, 7 SWS)**

Attendance in lab course is compulsory!

Lab Course Interface Phenomena (SS 2019, Praktikum, 7 SWS, Rainer Fink et al.)

Lab Course Interface Phenomena (WS 2019/2020, Praktikum, 7 SWS, Rainer Fink et al.)

### Inhalt:

The module focuses on physical, chemical or technological aspects of modification, manipulation and characterization of interfaces. These aspects relate to the research of ideal model systems (surfaces and adsorbates on single crystal surfaces) or real systems, in which the interface plays a crucial role for the respective properties. In all cases, the local electronic and chemical interactions at the interface affect the geometric structure (e.g. adsorption geometry) and consequently the chemical and physical properties.

### Lernziele und Kompetenzen:

Students

- deepen their knowledge in experimental methods and theoretical aspects to describe and characterize interface phenomena

- are familiar with different modern analytical techniques and can employ them in practice
- are able to perform experiments independently and to analyse the data
- are familiar with the model-type description of experimental data and are confident with the model-based description and modelling of experimental data
- will be able to present and discuss their results and actual topics related to interface science in front of a specialist audience.

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**Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:**

Das Modul ist im Kontext der folgenden Studienfächer/Vertiefungsrichtungen verwendbar:

**[1] Chemie (Master of Science): 1-2. Semester**

(Po-Vers. 2009 | NatFak | Chemie (Master of Science) | Wahlpflichtmodul | Grenzflächenphänomene)

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**Studien-/Prüfungsleistungen:**

Grenzflächenphänomene (Prüfungsnummer: 65601)

(englische Bezeichnung: Oral Examination or Examination (Klausur) on Interface Phenomena)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 45

Anteil an der Berechnung der Modulnote: 100%

weitere Erläuterungen:

O45, 2 examiners (PL)

EX (SL)

EX (SL) LAB (SL)

Grading procedure: Result of the oral examination (100%)

Prüfungssprache: Englisch

Erstablesung: WS 2019/2020, 1. Wdh.: SS 2020

1. Prüfer: Rainer Fink

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**Bemerkungen:**

Module compatibility: M.Sc. Chemie / M.Sc. Molecular Science (Elective module)