

---

**Modulbezeichnung:** Heterogenous Catalysis and Kinetics (IntCat-3) 5 ECTS  
 (Heterogenous Catalysis and Kinetics)

Modulverantwortliche/r: Jörg Libuda  
 Lehrende: Jörg Libuda

---

|                        |                        |                       |
|------------------------|------------------------|-----------------------|
| Startsemester: SS 2021 | Dauer: 1 semester      | Turnus: jährlich (SS) |
| Präsenzzeit: 45 Std.   | Eigenstudium: 105 Std. | Sprache: Englisch     |

---

**Lehrveranstaltungen:**

Heterogeneous Catalysis and Kinetics (SS 2021, Seminar, 1 SWS, Jörg Libuda)  
 Heterogeneous Catalysis and Kinetics (SS 2021, Vorlesung, 2 SWS, Jörg Libuda)

---

**Inhalt:**

Syllabus:

- Concepts in heterogeneous catalysis: definition of terms, industrial processes
- Characterization methods for real catalysts (in-situ and operando methods, TEM, SEM, XRD, EXAFS, XANES, XPS, SIMS, DRIFTS, Raman, TPR, etc.)
- Surface Reaction Dynamics: dynamics of adsorption, reaction, desorption, molecular beam experiments, laser spectroscopies
- Elementary Kinetics: microkinetics, transition-state theory, relaxation kinetics, rate-determining step; microkinetic experiments, TAP, SSITKA, etc.
- Model Catalysis: growth processes, preparation and characterization of model catalysts; kinetics on nanostructured surfaces
- Energy-related model catalysis (incl. examples from current research)

**Lernziele und Kompetenzen:**

Students ...

- acquire the professional competence in heterogeneous catalysis and respective topics
- obtain advanced knowledge in different experimental or theoretical models, their application to current problems, the corresponding data evaluation and interpretation using current research examples
- get familiar with various modern experimental techniques and are able to apply them in a targeted manner

**Literatur:**

O. Brummel, J. Libuda: "Electrifying Oxide Model Catalysis: Complex Electrodes based on Atomically-Defined Oxide Films", Catalysis Letters, 150 (2020) 1546-1560.

---

**Studien-/Prüfungsleistungen:**

Heterogenous Catalysis and Kinetics (Prüfungsnummer: 65331)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 20

Anteil an der Berechnung der Modulnote: 100%

weitere Erläuterungen:

O20(PL): Oral examination (20 minutes) or alternative examination according to the FAU Corona Statutes!

Prüfungssprache: Englisch

Erstablingung: SS 2021, 1. Wdh.: WS 2021/2022

1. Prüfer: Jörg Libuda

---

**Organisatorisches:**

- **Heterogenous Catalysis and Kinetics** will be taught online (synchronous) till further notice!
- please note: students have to register for the module examination on MeinCampus (check registration periods)!
- Information/registration available on StudOn!

**Bemerkungen:**

Module compatibility:

- Lecture module within the **Compulsory Elective Module** “**Advances in Interface Science & Catalysis**” in M. Sc. Chemistry or M. Sc. Molecular Science
- as part of the **Elective Module** in M.Sc. Chemistry/MSc. Molecular Science