

Modulbezeichnung: Molecular Nanoscience I (Nano-1) **15 ECTS**
(Molecular Nanoscience I)

Modulverantwortliche/r: Andreas Hirsch

Lehrende: Julien Bachmann, Andreas Hirsch, Rainer Fink, Franziska Gröhn

Startsemester: WS 2020/2021

Dauer: 1 Semester

Turnus: jährlich (WS)

Präsenzzeit: 150 Std.

Eigenstudium: 300 Std.

Sprache: Englisch

Lehrveranstaltungen:

1. Supramolecular Chemistry & Molecular Materials (Seminar 2SWS):

Information/registration: <https://www.studon.fau.de/crs3388402.html>

Supramolecular Chemistry and Molecular Materials (WS 2020/2021, Seminar, 2 SWS, Andreas Hirsch)

2. From 2D assemblies to bulk (Lecture 2 SWS):

Information/registration: <https://www.studon.fau.de/crs3369939.html>

From 2D assemblies to bulk (WS 2020/2021, Vorlesung, 2 SWS, Julien Bachmann)

3. Nanoprobes I (Seminar 2SWS):

Information/registration: <https://www.studon.fau.de/crs3436786.html>

Nanoprobes (WS 2020/2021, Seminar, Rainer Fink)

4. Self-assembly: molecular, particulate and hybrid nanostructures (Lecture 2SWS):

Self-assembly (WS 2020/2021, Vorlesung, Franziska Gröhn)

5. Molecular Nanoscience (Seminar 2SWS):

Molecular Nano Science (WS 2020/2021, Seminar, Franziska Gröhn et al.)

Inhalt:

- Concepts in supramolecular chemistry; host-guest chemistry; energetics of supramolecular complexes: experimental methods; templates and self-assembly. Molecular devices. Supramolecular catalysis: principles of supramolecular catalysis, supramolecular metal catalysis, self-assembled catalysts, metal-free catalysis, enzyme mimics, antibodies, imprinted polymers.
- Nanoscaled systems, general issues of microscopic techniques; experimental techniques with nanometer resolution: resolution determination; image processing techniques, light microscopic techniques with light in the visible and IR range, confocal techniques, scanning probes (STM, AFM and related scanning probes).
- Specific topics in synthesis and analysis of specific molecule-based nanoscale objects
- 2D film fabrication techniques (PVD, ALD, etc.)

Lernziele und Kompetenzen:

The students are capable ...

- to explain the fundamental chemical and physical properties of nano-scale materials
- to distinguish and to compare some properties, structure and applications of different nanomaterials
- to describe and to evaluate the major concepts in supramolecular chemistry, molecular self-assembly and nano-scaled 2D materials and transfer knowledge to related topics
- to judge on potential nano-analytical tools with optimized image contrast

Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

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

[1] Molecular Science (Master of Science): ab 1. Semester

(Po-Vers. 2020w | NatFak | Molecular Science (Master of Science) | MolSc Module NANO | Studienrichtung Molecular Nanoscience | Molecular Nanoscience I)

Studien-/Prüfungsleistungen:

Molecular Nanoscience I (Prüfungsnummer: 30711)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 30

Anteil an der Berechnung der Modulnote: 100%

weitere Erläuterungen:

O30(PL): Oral examination (30 minutes) or alternative examination according to the FAU Corona Statutes!

Prüfungssprache: Englisch

Erstablesung: WS 2020/2021, 1. Wdh.: SS 2021

1. Prüfer: Julien Bachmann

1. Prüfer: Rainer Fink

1. Prüfer: Franziska Gröhn

1. Prüfer: Andreas Hirsch

Organisatorisches:

Please note:

- **Molecular Nanoscience I (Nano-1)** is taught online and in winter term only! Please note:
- Students have to register for the module (check registration period on MeinCampus)!
- Registration/further information via StudOn: see lectures in UnivIS!

1) <https://www.studon.fau.de/crs3388402.html>

2) <https://www.studon.fau.de/crs3369939.html>

3) <https://www.studon.fau.de/crs3436786.html>

4) <https://www.studon.fau.de/crs3291362.html>

5) <https://www.studon.fau.de/crs2762707.html>

Bemerkungen:

This module represents one out of two lecture modules within the **Core Module "Molecular Nanoscience"** within the M.Sc. degree programme Molecular Science: Molecular Nanoscience I (only in winter term) + II (only in summer term)