Modulbezeichnung:	**Nanotechnology of Disperse Systems (Nano)** (Nanotechnology of Disperse Systems)	**5 ECTS**
Modulverantwortliche/r:	Robin N. Klupp Taylor, Monica Distaso	
Lehrende:	Monica Distaso, Robin N. Klupp Taylor	

Startsemester: SS 2021	Dauer: 1 semester	Turnus: halbjährlich (WS+SS)
Präsenzzeit: 45 Std.	Eigenstudium: 105 Std.	Sprache: Englisch

Lehrveranstaltungen:

Nanotechnology of Disperse Systems (SS 2021, Vorlesung, 2 SWS, Robin N. Klupp Taylor et al.)
Übung Nanotechnology of Disperse Systems (SS 2021, Übung, 1 SWS, Robin N. Klupp Taylor et al.)
Nanotechnology of Disperse Systems: Synthesis, Formation Mechanisms and Applications of Mesocrystals (SS 2021, Vorlesung, Monica Distaso)

Inhalt:

- Introduction to nanodisperse systems and their broad fields of application and research
- Revision of the fundamentals of colloid science
- Fundamental aspects of the preparation of nanodisperse systems (Thermodynamic fundamentals; Hydrolysis and polycondensation (metal oxides); Redox-reactions (metals); Control of particle size and morphology)
- Morphological characterization of nanodisperse systems (Optical methods; Electron microscopy; Scanning probe microscopy
- Properties of nanodisperse systems (Optical properties; Magnetic properties)
- Advanced nanodisperse systems (multifunctional particles, self-assembly)

Lernziele und Kompetenzen:

On completion of the lecture course students will be able to:

- Identify major applications and research fields of nanodisperse systems
- Identify and explain the fundamental theories of nucleation and growth and colloidal stability
- Differentiate between different approaches for the preparation of nanodisperse systems
- Select metal and metal oxide precursors and oxidizing/reducing agents according to their thermodynamic properties.
- Give examples of means to control nanoparticle size, shape and agglomeration state
- Distinguish between different characterization tools according to their advantages and disadvantages for the analysis of nanodisperse systems
- Identify the influence of particle size on key physical properties
- Match physical properties of nanoparticles to current or emergent applications

Literatur:

- Everett, D.H. Basic Principles of Colloid Science, Cambridge, Royal Society of Chemistry 2007
- Vollath, Dieter, Nanoparticles, nanocomposites, nanomaterials. Weinheim, Wiley-VCH, 2013
- Nogi, Kiyoshi, Naito, Makio, and Yokoyama, Toyokazu. Nanoparticle Technology Handbook , Amsterdam, Elsevier 2012
- Pelton, Matthew, and Bryant, Garnett W. Introduction to Metal-Nanoparticle Plasmonics. Somerset, NJ, USA: John Wiley & Sons, 2013
- Gubin, Sergei. Magnetic Nanoparticles. Weinheim, Wiley-VCH, 2009

Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

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

[1] **Energietechnik (Master of Science)**

(Po-Vers. 2018w | TechFak | Energietechnik (Master of Science) | Gesamtkonto | Studienrichtung Verfahrenstechnik der Energiewandlung | Modulgruppe Erneuerbare Energien (EE) | Nanotechnology of Disperse Systems)

Dieses Modul ist daneben auch in den Studienfächern "Chemical Engineering - Nachhaltige Chemische Technologien (Master of Science)", "Chemie- und Bioingenieurwesen (Master of Science)" verwendbar.

Studien-/Prüfungsleistungen:

Mündliche Prüfung Nanotechnology of Disperse Systems (Prüfungsnummer: 53501)
(englische Bezeichnung: Nanotechnology of Disperse Systems)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 30
Anteil an der Berechnung der Modulnote: 100%
weitere Erläuterungen:
gemäß Corona-Satzung gegebenenfalls Durchführung in digitaler Form
Prüfungssprache: Englisch

Erstablegung: SS 2021, 1. Wdh.: WS 2021/2022
1. Prüfer: Robin N. Klupp Taylor
