

# 课程大纲

## COURSE SYLLABUS

1.	<b>课程代码/名称 Course Code/Title</b>	CHE5028 纳米材料与纳米技术 Nanomaterials and Nanotechnology
2.	<b>课程性质 Compulsory/Elective</b>	选修 Selective
3.	<b>课程学分/学时 Course Credit/ Hours</b>	2/32
4.	<b>授课语言 Teaching Language</b>	English
5.	<b>授课教师 Instructor(s)</b>	教授黄立民 Professor Huang Limin
6.	<b>先修要求 Pre-requisites</b>	无机化学, 有机化学及物理化学 Inorganic Chemistry, Organic Chemistry and Physical Chemistry
7.	<b>教学目标 Course Objectives</b>	
	This course provides balanced and comprehensive coverage of the fundamentals and processing techniques with regard to synthesis, characterization, properties, and applications of various 0-D, 1-D, and 2-D nanostructures including nanoparticles, quantum dots, nanowires (rods), carbon nanotubes, and graphene, as well as special nanomaterials such as ordered mesoporous materials and metal-organic coordination polymer (MOF). Emphasis is placed on understanding the synthesis design and property study of nanomaterials. The course will also provide the students with necessary background for understanding various nanomaterials characterization techniques, including X-ray scattering and diffraction, crystal structure analysis, electron microscopy, UV-vis absorption, AFM and so on.	
8.	<b>教学方法 Teaching Methods</b>	
	Lectures by instructors, online videos, discussions over various hot topics, and presentations of cutting-edge literatures by students. Students can be involved in active learning of the knowledge through multi-channels to activate their research motivations.	
9.	<b>教学内容 Course Contents</b>	
	<b>Section 1</b>	Introduction (2)
	<b>Section 2</b>	Characterization techniques of Nanomaterials (2)
	<b>Section 3</b>	Physical Chemistry of Solid Surfaces (2)
	<b>Section 4</b>	Zero-Dimensional Nanostructures: Nanoparticles and Quantum Dots (6)
	<b>Section 5</b>	One-Dimensional Nanostructures: Nanowires, Nanorods and Carbon Nanotubes (6)
	<b>Section 6</b>	Two-Dimensional Nanostructures: Graphene, Thin Films (6)
	<b>Section 7</b>	Special Nanomaterials: Mesoporous materials and MOF (4)
	<b>Section 8</b>	Nanostructures Fabricated by Physical Techniques (2)
	<b>Section 9</b>	Summary (1)
10.	<b>课程考核 Course Assessment</b>	

由学生查阅资料、做 PPT，介绍纳米材料的最新研究进展及应用（15-20 分钟/人）。在 PPT 汇报的基础上，撰写综述。  
成绩评定：平时成绩（包括出勤，讨论情况等）占 10%，学生做 PPT 及演讲情况占 40%，综述占 50%。

**11. 教材及其它参考资料 Textbook and Supplementary Readings**

1. “Nanostructures and Nanomaterials--Synthesis, Properties, and Applications”, 2nd Edition, by Guozhong Cao, Ying Wang, Imperial College Press 及其相应的中文版《纳米结构和纳米材料》(合成性能及应用第 2 版), (美)曹国忠/王颖,高等教育出版社 2012-01.
2. 《纳米材料和纳米结构》张立德, 牟季美, 科学出版社
3. 《纳米材料分析》黄惠忠 化工出版社
4. 有关纳米材料与技术的最新文献, 如 Science, Nature 及其子刊 Nature Materials, Nature Nanotechnology, ACS 期刊中 Nano Letters, ACS Nano 等