上海交通大学研究生专业课程信息收集表

Information Form for SJTU Graduate Profession Courses

<table>
<tr><th colspan="6">课程基本信息 Basic Information</th></tr>
<tr><td rowspan="2">*课程名称
Course Name</td><td colspan="5">（中文 Chinese）高分子物理与化学</td></tr>
<tr><td colspan="5">（英文 English）Polymer Physics and Chemistry</td></tr>
<tr><td>*学分
Credits</td><td>2</td><td>*学时
Teaching Hours</td><td colspan="3">32（1 学分=16 课时）</td></tr>
<tr><td>*开课学期
Semester</td><td>春季学期 Spring</td><td>*是否跨学期
Cross-semester?</td><td>否 No</td><td colspan="2">跨 Spanning over 个学期 Semesters（含夏季学期）。</td></tr>
<tr><td>*课程类型
Course Type</td><td>专业前沿课 Program Frontier Course</td><td>*课程分类
Course Type</td><td colspan="3">全日制课程 For full-time students</td></tr>
<tr><td>*课程性质
Course Category</td><td>专业课 Specialized Course</td><td>课程层次
Targeting Students</td><td colspan="3">硕博共用 All graduates</td></tr>
<tr><td>*授课语言
Instruction Language</td><td>中文 Chinese</td><td>主要授课方式
Teaching Method</td><td colspan="3">课堂教学 In class teaching</td></tr>
<tr><td>*成绩类型
Grade</td><td>等第制 Letter grading</td><td>主要考核方式
Exam Method</td><td colspan="3">论文 Essay</td></tr>
<tr><td>*开课院系
School</td><td colspan="5">材料科学与工程学院</td></tr>
<tr><td>所属学科
Subject</td><td colspan="5">材料科学与工程</td></tr>
<tr><td rowspan="2">负责教师
Person in charge</td><td>姓名 Name</td><td>工号 ID</td><td>单位 School</td><td colspan="2">联系方式 E-mail</td></tr>
<tr><td>朱申敏</td><td></td><td>材料学院</td><td colspan="2">smzhu@sjtu.edu.cn</td></tr>
<tr><th colspan="6">课程扩展信息 Extended Information</th></tr>
<tr><td>*课程简介
(中文)
Course Description</td><td colspan="5">本课程是一门面向研究生的专业前沿课。主要讲授高分子物理和化学的基础理论及研究方法，高分子物理重点阐述聚合物的结构与力学、热学、溶液、老化等性能之间的关系，包括高分子的链结构、聚集态结构、聚合物的形态结构，高分子溶液、高分子的松驰与转变、高分子的力学性能、高分子的电学性能以及其它基本性质及测试方法。从分子运动和热转变出发，讲授高分子的结构与性能的关系，为复合材料的设计、加工、应用、分析提供理论基础。进一步，结合具体的聚合物基复合材料的实例，介绍高分子化合物合成的基本理论，高分子化学反应的特征以及聚合方法的选择。通过本课程的学习，使学生对异彩纷呈的高分子材料领域有一个相对完整的了解，培养学生设计和合成基本聚合物的能力，能够较快地了解高分子材料的一些新的研究领域，培养学生综合分析问题、解决相关聚合物问题的能力。先修课程：材料化学</td></tr>
<tr><td>*课程简介
（English）
Course Description</td><td colspan="5">This course deals with the basic theories and research methods of polymer physics and chemistry, including two parts: polymer physics and polymer chemistry. Polymer physics focuses on the relationship between structure and properties of polymers, such as mechanics, heat, solution, aging and other properties. It includes the chain structure, the aggregation structure, the morphology of the polymer, the relaxation and transformation of polymer solution, the mechanical and electrical properties of polymer and other basic properties and testing methods. Based on the concept of molecular motion and thermal transformation, the relationship between structure and properties is systematically illustrated, which provides a theoretical basis for the design, processing, application and analysis of composite materials. Furthermore, the basic theory of polymer synthesis, the selection of polymerization method is introduced. Through the study of this course, students have a relatively comprehensive understanding of the diverse fields of polymer materials, cultivate the students' ability to design and synthesize basic polymers. After this course, it is expected that the students can understand quickly about some advanced research results in polymer materials and have the ability to analyze questions and solve related problems.
Prerequisite course: Material Chemistry</td></tr>
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*教学大纲 (中文) Syllabus	主要内容、课时数、教学方式等		
	概述及高分子链的近程结构	2	讲授
	高分子链的远程结构	2	讲授
	高分子链的凝聚态结构	2	讲授
	高聚物的结晶	2	讲授
	高聚物结晶的研究方法、液晶	2	讲授
	高聚物分子运动-玻璃化转变	2	讲授
	高聚物粘弹性	2	讲授
	高聚物的力学性能	2	讲授
	高分子溶液	2	讲授
	高聚物的导电性	2	讲授
	织态结构-高分子合金	2	讲授
	高聚物的增韧改性，界面与增容	2	讲授
	智能高聚物的合成设计	2	讲授
	聚合物的基本合成方法	2	讲授
	学生课程 PPT 展示	2	互动
	学生课程 PPT 展示	2	互动
*教学大纲 （English） Syllabus	Main contents, hours, teaching methods, etc		
	Overview and short range structure of polymer	2	lecture
	Long range structure of polymer	2	lecture
	Condensed structure of polymer	2	lecture
	Polymer crystallization	2	lecture

		Research method and liquid crystal in polymer	2	lecture	
		Polymer molecular motion and glass transition	2	lecture	
		Viscoelasticity of polymer	2	lecture	
		Mechanical properties of polymers	2	lecture	
		Polymer solution	2	lecture	
		Conductive polymer	2	lecture	
		Polymer alloy	2	lecture	
		Toughening modification, interface and compatibilization of polymers	2	lecture	
		Design and fabrication of intelligent polymers	2	lecture	
		Basic polymerization method	2	lecture	
		Students' Presentation using PPT	2	Discussion	
		Students' Presentation using PPT	2	Discussion	

*课程要求（中文）Requirements	课程的考核方式包括以下几个部分： 出席率 10%+平时的作业 40%（包括课堂小测验、回答问题、课后作业以及课堂的 PPT 展示）+大作业 50%（围绕主题，阅读文献，以综述的形式提交报告）
*课程要求（English）Requirements	The assessment method of the course includes the following parts: attendance rate of 10% + normal assignments of 40% (including classroom quiz, question answering, homework after class and PPT presentation in class) + major assignments of 50% (submitting the report in the form of review on a short topic)
*课程资源（中文）Resources	1. “高分子材料进展”，张留成, 王家喜 编著，化学工业出版社，第二版，2014 （研究生规划教材） 2. “高分子研究方法”，董炎明 熊晓鹏 郑薇 杨柳林 编著，中国石化出版社，2011 3. “新编高聚物的结构与性能”，何平笙 编著，科学出版社，2009 Canvas Canvas: http://oc.sjtu.edu.cn/
*课程资源（English）Resources	1. "Progress in Polymer materials", Zhang Liucheng, Wang Jiaxi, Chemical Industry Press, Second Edition, 2014 (postgraduate planning textbook) 2. "Polymer Research Methods", by Dong Yanming, Xiong Xiaopeng, Zheng Wei, Yang Liulin, Sinopec press, 2011 3. "Structure and Performance of New Polymer", by He Pingsheng, Science Press, 2009 Course Website: http://oc.sjtu.edu.cn/
备注 Note	