

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

| 课程基本信息 Basic Information | | | | |
|---|--|----------------------------------|------------------------------|---|
| *课程名称 Course Name | (中文 Chinese) 生态环境材料学 | | | |
| | (英文 English) Eco-materialogy | | | |
| *学分 Credits | 2 | *学时 Teaching Hours | 32 (1 学分=16 课时) | |
| *开课学期 Semester | 春季学期 Spring | *是否跨学期 Cross-semester? | 否 No | 跨 Spanning over 一个学期 Semesters (含夏季学期)。 |
| *课程类型 Course Type | 专业选修课 Program Elective Course | *课程分类 Course Type | 全日制课程 For full-time students | |
| *课程性质 Course Category | 专业课 Specialized Course | 课程层次 Targeting Students | 硕士课程 Master Level | |
| *授课语言 Instruction Language | 中文 Chinese | 主要授课方式 Teaching Method | 课堂教学 In class teaching | |
| *成绩类型 Grade | 等第制 Letter grading | 主要考核方式 Exam Method | 论文 Essay | |
| *开课院系 School | 材料科学与工程学院 School of Materials Science and Engineering | | | |
| 所属学科 Subject | 材料科学与工程 | | | |
| 负责教师 Person in charge | 姓名 Name | 工号 ID | 单位 School | 联系方式 E-mail |
| | 疏达 | | 材料科学与工程学院 | dshu@sjtu.edu.cn |
| 课程扩展信息 Extended Information | | | | |
| *课程简介 (中文) Course Description | <p>(分段概述课程定位、教学目标、主要教学内容、先修课程等；不少于 200 字。)</p> <p>生态环境材料学是关于材料及材料循环过程与生态环境相互作用的科学，其目的在于使材料在满足需要的前提下，使材料在其整个寿命周期中对环境施加的负荷最小。本课程从探讨传统材料产业所面临的日益严峻的环境问题出发，学习生态环境材料的由来、基本内涵与意义；了解并掌握生命周期评价 (LCA) 方法及其在材料环境协调性评价中的应用；在此基础上，针对钢铁、有色金属、陶瓷、高分子等传统材料，重点研讨如何从生态设计、生态制备、循环利用等方面改善其环境协调性；另一方面，针对迅猛发展的新型生态环境功能材料，如金属空气电池材料、光催化材料、污水净化材料、空气净化材料、噪声控制材料、生物降解材料、生态建材等，结合文献阅读和课堂研讨，了解典型的环境相容材料、环境降解材料以及环境工程材料等的发展状况。</p> | | | |
| *课程简介 (English) Course Description | <p>(须与中文一致，翻译请力求信达雅。)</p> <p>Eco-materialogy is an interdiscipline about the interaction between materials, material cycling process and ecological environment. Its purpose is to minimize the load of materials on environment in the whole life cycle while meeting the performance requirement of materials. This course starts from discussing the increasingly serious environmental problems faced by traditional materials industry, learning the origin, basic conception and significance of eco-materials, understanding and mastering the life cycle assessment (LCA) method and its application in materials. On this basis, we focus on how to improve the environmental compatibility of steel, non-ferrous metals, ceramics, polymers and other traditional materials in the aspects of eco-design, eco-processing and recycling. Besides, the rapid development of new functional eco-materials, such as metal-air battery materials, photocatalysis materials, sewage purification materials, air purification materials, noise control materials, biodegradable materials, will also be discussed in this course.</p> | | | |

| | |
|---|---|
| <p>*教学大纲 (中文) Syllabus</p> | <p>(建议列表形式, 各列内容: 章节、主要内容、课时数、教学方式等)</p> <ol style="list-style-type: none"> 1. 材料与环境 4学时 课堂教学 了解生态环境材料学的时代背景, 了解钢铁、水泥、硅、稀土等典型材料的环境负荷, 认识传统材料产业所面临的环境压力。 2. 生态材料学概论 2学时 课堂教学 掌握生态环境材料和生态材料学的基本内涵, 学习最小负荷原理。 3. 材料环境协调性评价及应用 4学时 课堂教学 掌握生命周期评价方法的基本框架, 了解生命周期评价在材料与产品环境协调性评价中的应用。 4. 典型材料的环境协调性分析 6学时 课堂教学 以铝为例, 认识典型材料的环境协调性, 学会从全生命周期角度改善材料的环境协调性, 了解铝在能源材料中的应用。 5. 材料生态设计 4学时 课堂教学 掌握金属、陶瓷、高分子和复合材料生态设计的思路, 了解材料素化等新的材料设计思想。 6. 材料生态制备技术 4学时 课堂教学 学习与环境相协调的各种材料制备技术, 通过文献调研总结材料生态设计与制备技术。 7. 新型生态环境材料 6学时 课堂教学 了解各种新兴环境功能材料的发展现状, 通过文献调研总结新型生态环境材料的发展现状及趋势。 8. 材料生态工业园区实地考察 2学时 实践教学 实地了解材料工业如何与环境协调发展。 |
| <p>*教学大纲 (English) Syllabus</p> | <ol style="list-style-type: none"> 1. Materials and Environment 4 teaching hours teaching in class Understand the era background of eco- materials, understand the environmental load of typical materials such as steel, cement, silicon and rare earth metals, and understand the environmental pressure caused by traditional materials industry. 2. Introduction of eco-materialogy 2 teaching hours teaching in class Master the basic connotation of eco-environmental materials and eco-materialogy, and learn the principle of minimum environmental load. 3. Evaluation and application of material and environment coordination 4 teaching hours teaching in class Master life cycle assessment methods, Understand the application of life cycle assessment in the environmental coordination evaluation of materials and products 4. Analysis of environmental coordination of typical materials 6 teaching hours teaching in class Understand the environmental coordination of typical materials, learn to improve the environmental coordination of materials from the perspective of the entire life cycle, and understand the application of aluminum in energy materials. 5. Material ecological design 4 teaching hours teaching in class Master ecological design ideals of metals, ceramics, polymers and composite materials, and understand new material design ideas such as materials plainification. 6. Material ecological preparation technology 4 teaching hours teaching in class Learn various material preparation techniques in harmony with environments, and summarize |

| | |
|---|--|
| | <p>material ecological design and preparation techniques through literature surveys.</p> <p>7. New eco-materials 6 teaching hours teaching in class Understand the development of various emerging environmental functional materials, and summarize the development and trends of new ecological environmental materials through literature survey.</p> <p>8. Field investigation of eco-material in industrial park 2 teaching hours filed visit Learn how the material industry develops in harmony with the environment.</p> |
| <p>*课程要求 (中文) Requirements</p> | <p>(课程考核方式、考核标准等; 不少于 50 字)</p> <p>考核: 平时成绩 = 10% 出勤和课堂表现 课堂展示 = 30% PPT汇报 大作业 = 60% 论文</p> |
| <p>*课程要求 (English) Requirements</p> | <p>GRADING: General performance = 10% Attendance and participation in class Presentation = 30% Oral presentation in class Homework = 60% Essay</p> |
| <p>*课程资源 (中文) Resources</p> | <p>1. 左铁镛, 聂祚仁. 环境材料基础, 北京: 科学出版社, 2003 2. 山本良一. 环境材料, 北京: 化学工业出版社, 1997 3. 山本良一. 生态设计. 北京: 化学工业出版社, 2003. 4. Michael F Ashby. 材料与环境 节能优选法 (Materials and the environment eco-informed material choice). 上海: 上海交通大学出版社, 2016</p> |
| <p>*课程资源 (English) Resources</p> | <p>1. Tiejong Zuo, Zuoren Nie, Fundamentals of Environmental Materials, Beijing: Science Press, 2003 2. Ryouichi Yamamoto, Environmental Materials, Beijing: Chemical Industry Press, 1997 3. Ryouichi Yamamoto, Ecological Design, Beijing: Chemical Industry Press, 1997 4. Michael F Ashby. Materials and the environment eco-informed material choice, Shanghai: Shanghai Jiao Tong University Press, 2016</p> |
| <p>备注 Note</p> | |