

## 化学 学科硕士研究生培养方案

### Master's degree program in Chemistry

一级学科代码：0703

Discipline code: 0703

#### 一、学科概况与研究方向

江苏大学化学学科是 2001 年学校合并组建后成立的学科之一，现为一级学科硕士学位授权点。学科 2003 年获无机化学硕士学位授予权，2006 年获物理化学硕士学位授予权，2011 年获化学一级学科硕士学位授予权，是首批学校重点建设学科，2016 年入选“十三五”江苏省重点（培育）学科，2021 年入选“十四五”江苏省重点学科。2022 年化学学科进入 ESI 全球排名前 1‰，现为 0.90‰（全球第 142 位），大陆高校排名第 34 位。

本学位点围绕国家重大战略需求，逐步形成了高分子化学、功能配合物及微纳米化学、化学成像与传感、界面与催化化学四个相对稳定、特色鲜明的研究方向，化学学科已发展成为目标定位合理、人才培养目标明确、学科方向稳定、国内外有一定影响力的理学学科。

#### Discipline overview and research direction

Found in 2001, chemistry is one of the disciplines that are developed in Jiangsu university. The discipline was granted the right to confer master's degree in inorganic chemistry and physical chemistry in 2003 and 2006, and obtained the authorization to offer master degree program in 2011. Meanwhile, chemistry is included in the 13<sup>th</sup> Five-Year Key Disciplines (Training program) in 2016 and selected into 14<sup>th</sup> Five-Year Plan Key Disciplines in Jiangsu province in 2021. The discipline of chemistry ranks NO. 34 in mainland Chinese universities and NO.142 in ESI, entering 1‰ of the whole list.

Focusing on requirements of the national strategical objective, the discipline of chemistry has gradually formed four distinctive research directions: polymer chemistry, functional complexes and micro/nano chemistry, chemical imaging and sensing, and interface-catalytic chemistry. Due to reasonable target orientation, clear talent training objectives and stable discipline direction, chemistry has developed into an important discipline with certain influence over the world.

#### 二、培养目标

坚持化学学科的交叉融合思路，鼓励多学科交叉培养，切实体现多学科交叉融合的优势。进一步加大化学与材料、环境、能源以及涉农方向的有机结合，大力推进学科交叉课程建设以及选修课程辅修工作，引导研究生积极选修国内外一流大学和国内优质慕课资源的相关课程，实现多元化学科培养。坚持服务社会需求为导向，立足学科前沿，围绕地方经济发展重大问题，化学学科依托国家级实验教

学示范中心、科技部中澳国际联合研究中心、江苏省重点实验室等教学科研平台，逐步形成了特色鲜明的研究方向并服务于地方经济发展。以培养地方经济建设所需、社会适应性强、具有较强创新意识和创新能力的化学专门人才为目标，坚持全面实践育人理念，立足化学学科发展趋势，依托化学学科与化工基础密切联系的优势，广泛建立产学研培养模式，鼓励校企联合培养研究生，增强研究生的实践学习与研发能力。培养出具有较扎实的化学基本理论知识和较宽的知识面，具有较强实验动手能力，具有一定的独立从事与化学相关的学术研究和产品研发的能力，可以独立开展科学研究和技术研发工作。

### **Training objectives**

Adhere to the idea of cross-integration of chemistry disciplines, encourage multi-disciplinary cross-training, and effectively reflect the advantages of multi-disciplinary cross-integration. Further increase the organic integration of chemistry with materials, environment, energy and agriculture-related directions, vigorously promote the construction of interdisciplinary courses and the minor work of elective courses, and guide graduate students to actively choose courses related to first-class universities domestic and overseas and domestic high-quality MOOC resources to achieve diversification training. Adhering to the orientation of serving the needs of the society and the frontier of the discipline, and focusing on major issues of local economic development, the chemistry discipline has gradually formed a teaching and scientific research platform such as the National Experimental Teaching Demonstration Center, the China-Australia International Joint Research Center of the Ministry of Science and Technology, and the Key Laboratory of Jiangsu Province with distinctive research direction and serving the local economic development. Aiming at cultivating chemistry professionals who are needed for local economic construction, have strong social adaptability, and have strong innovation consciousness and ability, adhere to the concept of comprehensive practice and education, based on the development trend of chemistry, relying on the close connection between chemistry and chemical engineering. To take advantage of the advantages, establish an industry-university-research training model extensively, encourage school-enterprise joint training of postgraduates, and enhance postgraduates' practical learning and research and development capabilities. Cultivate a solid basic theoretical knowledge of chemistry and a wide range of knowledge, the students should have strong experimental ability, have a certain ability to independently engage in chemistry-related academic research and product development, and can independently carry out scientific research and technology research and development work.

## **三、培养方式及学习年限**

### **Training modes and the duration of study**

#### **1. 培养方式**

- (1) 硕士研究生需在一年内完成所有选定的学位必修课和选修课。
- (2) 有效利用至少 18 个月的时间从事学位论文研究工作，完成硕士论文并通过学位论文答辩。
- (3) 硕士研究生在学期间应至少完成 26 个课程学分,8 个实践学分。

### 1. Training modes

(1) The graduate students for Chemistry major are required to accomplish all required degree courses and elective courses within one year.

(2) The graduate students should effectively work at least 18 months to engage in dissertation research, complete the master thesis and pass the dissertation defense.

(3) The graduate students should accomplish at least 26 course credits, 3 extension credits, and 8 practice credits during their studies.

### 2. 学习年限

硕士研究生的学制一般为 3 年，最长学习年限为 5 年。

### 2. Duration of study

The length of study for a master's degree is generally 3 years, and the longest study period is 5 years.

## 四、课程学分

### Course credits

#### 1. 学分要求

课程总学分不低于 26 学分，其中学位课不少于 14 学分，选修课不少于 12 学分。

### Credit requirements

The total credits of the course shall be no less than 26 credits, including no less than 14 credits for degree courses and no less than 12 credits for elective courses.

### 2. 课程设置

#### Curriculum

Course Category 课程类别		Course Name 课程名称	Credit 学分	Term 学期 (Spring/ Autumn)	School by which Courses opened 开课学院	type of the course 课程性质	Remark 备注
Degree courses 学位课	Public degree course 公共学位课	Integrated Chinese I 综合汉语 I	1.5		Language & Culture Center 语言文化中心		Compulsory 必修
		Integrated Chinese II 综合汉语 II	2.5		Language & Culture Center 语言文化中心		
		Overview of China 中国文化概论	3		OEC		

	<b>Basic Theory Course</b> 基础理论课	Advanced Inorganic Chemistry 高等无机化学	2	Autumn 秋学期	School of Chemistry and Chemical Engineering 化学化工学院	Bilingual Course 双语课程	At least 4 credits 至少 4 学分
		Modern Analytical Chemistry 现代分析化学	2	Autumn 秋学期			
		Advanced Organic Chemistry 高等有机化学	2	Autumn 秋学期			
		Advanced physical Chemistry 高等物理化学	2	Autumn 秋学期			
	<b>Core Specialized Degree Courses</b> 核心专业学位课	Modern Spectrometry 现代波谱解析	3	Autumn 秋学期	School of Chemistry and Chemical Engineering 化学化工学院	bilingual course 双语课程	At least 3 credits 至少 3 学分
<b>Non-degree course</b> 非学位课	<b>Specialized Elective Courses</b> 专业选修课	Advanced Instrument Analysis Experiment 高等仪器分析实验	3	Autumn 秋学期	School of Chemistry and Chemical Engineering 化学化工学院	Experimental Course 实验平台	At least 5 credits 至少 5 学分
		Chemical and Chemical Engineering Frontiers 化学化工前沿讲座	2	Spring 春学期/ Autumn 秋学期		Cutting-edge lecture 前沿讲座	

		Biomass Conversion and Application 生物质转化与应用	2	Spring 春学期			
		Applied Electrochemistry 应用电化学	2	Spring 春学期			
		Modern Synthetic Chemistry 现代合成化学	2	Spring 春学期			
		Catalytic Chemistry 催化化学	2	Spring 春学期			
		Organometallic Chemistry 金属有机化学	2	Spring 春学期			
		Advanced Polymer Materials and Applications 先进高分子材料及应用	2	Spring 春学期			
					School of Chemistry and Chemical Engineering 化学化工学院	Bilingual Course 双语课程	At least 7 credits 至少 7 学分
	<b>Public Elective Courses</b> 公共选修课	All graduate programs in all disciplines throughout the school 全校所有学科的全部研究生课程					Optional 任选

Note: Please specify the type of the course { English taught course, bilingual course, cutting-edge lecture or experimental course }

课程性质中请明确是全英文课程、双语课程、前沿讲座或实验平台课程等

## 五、拓展学分要求

### Extended credit requirements

No requirements

不做要求

## 六、实践学分要求

### Practice credit requirements

#### 1. 学术活动

研究生必须参加学校组织的“学术道德规范讲座”和国内外知名专家学者的专题讲座、学术报告、研究生论坛等学术研讨活动，参加学术研讨活动后必须形成完整的学术报告。在读期间，应参加 10 次以上学术报告活动。鼓励研究生在学期间参加国际会议或全国性高层次学术会议，在大会上宣读本人的学术论文并交流发言，可视同其学术活动环节合格。

#### 1. Academic activities

Graduate students must participate in the "Academic Ethics Lectures" organized by the school and special lectures, academic reports, postgraduate forums and other academic seminars organized by well-known experts and scholars, and must form a complete academic report after participating in the academic seminars. During the study period, graduate students should participate in more than 10 academic reporting activities. Graduate students are encouraged to participate in international conferences or national high-level academic conferences during their studies, read out their academic papers and exchange ideas at the conference, which can be regarded as qualified for their academic activities.

#### 2. 文献阅读

外文文献阅读于学位论文开题前由学科组织专家小组统一考核并记录成绩，不合格者不得进入学位论文开题环节。

#### 2. Literature reading

The foreign language literature reading will be uniformly assessed and recorded by an expert group organized by the discipline before the proposal of the dissertation. Those who fail to pass will not be allowed to enter the opening of the dissertation.

#### 3. 专题研讨

研究生在学期间必须在学科范围内（以大科研团队为单位）公开进行文献研读交流、学术研究进展汇报和专题研讨汇报，硕士研究生不得少于 4 次。

#### 3. Symposium

During the period of study, graduate students must openly conduct literature investigation, academic research progress and special seminar report within the scope of the discipline in the unit of large scientific research group with no less than 4 times.

#### 4. 实践环节

学术型硕士研究生（在职人员除外）在校期间必须进行不少于 1 个月时间的实践环节，方式内容：（1）指导本科生实验或科研立项、批改实验报告和作业，完成 40-50 学时工作量，并由主管教学工作的教师写出评语；（2）有条件的学生到工厂参与导师的合作课题或进行见习，完成社会实践并上交社会实践报告；（3）根据工作需要参加社会调研或技术推广工作，由负责老师审核签字认可。

#### 4. Practical

Academic graduate students (except in-service personnel) must have a practical of not less than one month during their stay in school. The content of the method is: (1) Instruct undergraduates to set up

experiments or scientific research projects, correct experimental reports and assignments, and complete the 40-50 hours of workload. The teacher in charge of the teaching will write comments; (2) Students should go to the factory to participate in the cooperative projects of the tutors or conduct traineeships if the conditions allowed, complete social practice and submit the social practice report; (3) According to the needs, graduate students should participate in social research or technical promotion work, which shall be reviewed and signed by the responsible teacher.

## **5. 综合考核**

研究生在进入开题前，本学科组织对其学术活动、文献阅读、专题研讨、专业实践等情况开展综合考核，要求研究生取得不低于 8 学分的实践学分，其中学术活动 2 学分、文献阅读 2 学分、专题研讨 4 学分、实践环节 1 学分。综合考核结果作为论文开题是否通过的依据之一。

## **5. Comprehensive assessment**

Before entering the proposal, the discipline will organize a comprehensive assessment of the academic activities, literature reading, seminars, professional practice, etc., and requires graduate students to obtain no less than 8 credits for practice, including 2 credits for academic activities, 2 credits for literature reading, 4 credits for seminars, and 1 credit for practical sessions. The comprehensive assessment results are used as one of the basis for whether the thesis is passed or not.

# **七、学位论文与学位授予**

学位论文是衡量研究生培养质量和学术水平的主要标志。

## **Dissertation and Degree Awarding**

Dissertation is the main indicator to measure the quality and academic level of postgraduate training.

### **1. 论文开题**

开题是研究生培养过程中开展学位论文工作的首要环节。研究生在撰写学位论文之前，必须经过认真的调查研究，查阅大量的文献资料尤其是外文文献，了解本人主攻研究方向的历史和现状，在此基础上确定学位论文研究题目，并作论文开题报告。开题报告应论述学位论文选题依据、研究方案、预期目标与科研成果、工作计划等关键问题。研究生学位论文实行集中开题，由学科（学院）统一组织，研究生学位论文开题必须经导师审核同意方可进行。学科应成立学位论文开题专家考核小组（导师和指导小组成员必须回避），由本学科或相关学科至少 5 名专家组成，并确定一名负责人主持开题考核工作。学位论文开题试行专家小组评分（等级）制度，硕士研究生学位论文开题暂缓通过的比例不得少于实际开题人数的10%。每位研究生在学期间至多两次学位论文开题机会，两次开题时间间隔不得少于 3 个月，两次开题均未通过者按退学处理。硕士生学位论文开题报告审核通过一年（至少8个月，2.5年学制的专硕开题审核通过6个月）后方可申请送审答辩；博士生学位论文开题报告审核通过两年（至少16个月）后方可申请送审答辩。具体要求详见《江苏大学研究生学位论文选题与开题的要求及考核办法》。

### **1. Dissertation proposal**

The dissertation proposal is the first and foremost part of the dissertation work in the postgraduate training process. Before writing a dissertation, postgraduates must conduct serious investigation and research,

consult a large number of literature materials, especially foreign literature, and understand the history and current situation of their main research direction. The proposal should discuss key issues such as the basis for the dissertation topic selection, research plan, expected goals and scientific research results, and work plan. Postgraduate dissertation is subject to centralized opening, organized by the discipline (college) uniformly, and the opening of graduate dissertation must be reviewed and approved by the supervisor. The subject should set up an expert assessment team for dissertation proposal (tutors and members of the guidance team must be avoided), composed of at least 5 experts from the discipline or related disciplines, and a person in charge is designated to preside over the opening assessment. The expert group grading system will be implemented on a trial basis for the proposal of dissertation papers, and the proportion of postgraduate dissertation papers that will be postponed and passed shall not be less than 10% of the actual number of participants. Each postgraduate student shall have at most two opportunities to have a dissertation proposal during the study period, and the time interval between the two proposal shall not be less than 3 months. Those who fail to pass the two proposal will be regarded as withdrawing from the school. The master's dissertation proposal will be reviewed for one year (at least 8 months, and the 2.5-year master's master's opening report will be reviewed and approved for 6 months) before application for defense; doctoral dissertation proposal has been reviewed for two years (at least 16 months) before submitting an application for a defense. For specific requirements, please refer to <Requirements and Assessment Methods for Topic Selection and Proposal of Postgraduate Dissertations of Jiangsu University>.

## **2. 科研训练与科研成果**

研究生在学期间须参与科研训练,并获得一定的科研训练成果积分,具体要求详见《江苏大学关于研究生在读期间完成科研训练积分的规定》和学院学位评定分委员会提出的相关要求。

### **2. Scientific research training and scientific research achievements**

Postgraduates must participate in scientific research training during their studies and obtain a certain amount of scientific research training achievement points. For specific requirements, please refer to the <Regulations of Jiangsu University on the Completion of Scientific Research Training Points for Postgraduates During Their Study> and the related requirements of the academic degree evaluation sub-committee of the college.

## **3. 中期汇报**

研究生在学位论文工作中中期应作中期汇报。具体办法为:由所在学院指定负责人组织不少于3名副高及以上职称的专家组成考核小组(包括主导师),举行公开报告会,由研究生对论文工作情况进行全面介绍,考核小组成员指出存在的问题,并提出改进意见。报告会需做好详细记录,考核小组针对研究生中期研究工作的情况给出评语和成绩,填写考核表,经考核小组负责人签字后交学院主管院长审核。中期汇报不通过者应明确论文工作延长时间,并再次组织中期汇报,直至通过。

### **3. Mid-term report**

Graduate students should make a mid-term report in the middle of the dissertation. The specific method is as follows: the person in charge of the school will organize no less than 3 experts with the title of deputy senior or above to form an assessment team (including the main tutor), hold a public report meeting, and the graduate



students will give a comprehensive introduction to the work of the thesis, and the members of the assessment team will be point out the existing problems and make suggestions for improvement. The report meeting needs to be recorded in detail. The assessment team will give comments and scores on the postgraduate mid-term research work, fill in the assessment form, and submit it to the dean of the college for review after being signed by the person in charge of the assessment team. Those who do not pass the mid-term report should clarify the extension time of the thesis, and organize another mid-term report until it is passed.

#### **4. 论文撰写**

学位论文必须在导师指导下由研究生本人独立完成，论文格式参见《江苏大学研究生学位论文撰写要求》。

#### **4. Dissertation writing**

The dissertation must be completed independently by the graduate student under the guidance of the supervisor. For the format of the dissertation, please refer to <Requirements for Writing a Dissertation for Graduate Students of Jiangsu University>.

#### **5. 论文评阅与答辩**

研究生的课程学习、能力拓展、培养环节、论文开题和中期汇报等均满足要求后方可进入学位论文送审、答辩（含预答辩）环节。学位论文送审、答辩等要求详见《江苏大学学位授予工作实施细则》和《江苏大学研究生学位论文送审工作办法》等相关规定。

#### **5. Thesis review and defense**

The postgraduate course study, ability development, training links, thesis opening and mid-term report, etc. have all met the requirements before entering the dissertation review and defense (including pre-defense). For the requirements of dissertation submission and defense, please refer to the relevant regulations such as <Detailed Implementation Rules of Jiangsu University Degree Awarding Work> and <Jiangsu University Postgraduate Dissertation Submission Work Measures>.

### **八、其他要求**

其他详见《关于做好2022年度研究生培养方案修(制)订工作的通知》等相关文件及规定。

#### **Other Requirements**

For other details, please refer to the Notice on the Revision (Preparation) and Formulation of the 2022 Graduate Training Program and other relevant documents and regulations.

### **附、需阅读的主要经典著作和专业学术期刊目录**

#### **Appendix: Catalogue of professional journals to be read**

##### **一、主要经典著作**

##### **Main Classic works**

1. 理论无机化学. 陈慧兰, 余宝源. 高等教育出版社, 1989
2. 无机化学原理. 郑能武, 刘清亮, 刘双怀. 中国科学技术出版社, 1988
3. 无机化学原理. W.L.乔利, 王盛水. 高等教育出版社
4. 高等无机化学. F.A.科顿, 北京师范大学等. 人民教育出版社, 1988

5. 催化化学. 吴越. 科学出版社, 1995
6. 功能高分子与新技术. 何天白, 胡汉杰. 化学工业出版社, 2001
7. 有机分析. 陈耀祖. 高等教育出版社, 1983
8. 电化学原理与方法. 张祖训, 汪尔康. 科学出版社, 2000
9. 量子化学 (上. 中. 下). 徐光宪. 科学出版社, 2001
10. The Structure of Materials. Allen S. M. and Thomas E. New York: John & Sons. Inc., 1998
11. 结构与材料. 曹阳. 高等教育出版社, 2003
12. 固体催化剂研究方法 (上. 下册). 辛勤. 科学出版社, 2004
13. 分子筛与多孔材料化学. 徐如人, 庞文琴. 科学出版社, 2004
14. Heterogeneous Catalysis, Principle and Applications, G. C. Bood, Oxford Uni. Press, 1974
15. 无机合成与制备化学. 徐如人, 庞文琴. 高等教育出版社, 2001
16. Contact catalysis, Z. B. Szabo and D. Kallo, Elsevier Amsterdam, 1976
17. The Physics and Chemistry of Solid. Elliot S.R. New York: John & Sons. Inc, 1998

## 二、主要外文专业学术期刊

### Major foreign academic journals

1. Nature
2. Science
3. Nature Materials;
4. Nature Nanotechnology;
5. Advanced Materials
6. Nature Chemistry;
7. Journal of the American Chemical Society;
8. Angewandte Chemie International Edition;
9. Nature Chemical Biology;
10. Nature Communications;
11. Science Advances;
12. The Journal of Physical Chemistry Letters;
13. Chemical Science;
14. Organic Letters;
15. Analytical Chemistry;
16. Chemical Communications;
17. Macromolecules;
18. Inorganic Chemistry
19. Nano Letters;
20. Proceedings of the National Academy of Sciences of the United States of America