

高分子化学専攻

I. 志望区分

区分	講座・分野 研究内容	対応する教育プログラム		
		連携教育プログラム		修士課程教育プログラム
		融合工学コース	高度工学コース	
401	先端機能高分子講座 今年度は募集しない			
402	高分子合成講座・機能高分子合成分野 分子設計、機能性高分子、超分子ポリマー、自己集合、導電性高分子、特異構造高分子、コロイド、自己修復材料、分子認識、刺激応答性、分子マシン、ゲル、ソフトマテリアル	物質機能・変換科学分野	生命・医工融合分野	総合医療工学分野
403	高分子合成講座・高分子生成論分野 高分子合成、精密重合、リビング重合、ラジカル重合、カチオン重合、機能性高分子、高分子精密合成、重合触媒設計、重合中間体の化学、配列制御、環状高分子、両親媒性ランダムコポリマー			
404	高分子合成講座・重合化学分野 重合化学、有機合成化学、元素化学、無機高分子、ヘテロ原子含有共役系高分子、有機-無機ハイブリッド材料、機能性高分子、環境応答性高分子、生体関連高分子、分子環境計測、分子イメージング			
405	高分子合成講座・生体機能高分子分野 生体関連高分子の自己組織化と機能、バイオインスパイアード科学、バイオメテイクス材料、タンパク質工学、糖鎖工学、ゲルマテリアル工学、バイオ・医療応用、人工細胞リボソーム工学			
406	高分子物性講座・高分子機能学分野 高分子ナノ構造、高分子光・電子物性、有機薄膜太陽電池、光化学、光物理学、高分子薄膜、電子移動、分光法			
407	高分子物性講座・高分子分子論分野 高分子溶液学、光・小角X線散乱法、粘度法を用いた高分子溶液の性質の解明、溶液中の孤立高分子、高分子鎖ダイナミクス、高分子集合体の分子論的理解	高学 専攻 定め 育ら う	子化 の教 育プ ロに 従 う	高学 専攻 定め 育ら う
408	高分子物性講座・基礎物理化学分野 高分子物性に関する理論・計算機シミュレーション・実験、高分子系の相転移、相転移ダイナミクス、高分子レオロジー、ゲルの物理化学、高分子の結晶化機構			
409	高分子設計講座・高分子物質科学分野 高分子構造、高分子固体物性、高分子高次構造解析と制御、高分子系の相転移のダイナミクス、中性子・X線・光散乱、光学・電子顕微鏡、ブロックコポリマーの誘導自己組織化、高分子結晶			
410	高分子設計講座・高分子材料設計分野 精密重合法による高分子材料合成、高分子の構造・物性解析、精密反応解析、リビングラジカル重合の基礎と応用、グラフト重合による表面・界面制御、機能性複合微粒子			
411	高分子設計講座・高分子制御合成分野 制御重合、精密高分子合成、リビング重合、ラジカル重合、ラジカル反応、環状π共役分子、有機合成化学、元素化学、機能性材料、ソフトマテリアル、高分子結晶			
412	医用高分子講座・生体材料科学分野 先端医療を目指したバイオマテリアルの設計・合成・評価に関する研究、再生医療工学（ティッシュエンジニアリング）、ドラッグデリバリーシステム（DDS）、幹細胞工学、再生誘導用材料・デバイス、医薬用材料・デバイス、生物研究用材料・デバイス、医療用材料・デバイス	生命・医工融合分野	物質機能・変換科学分野	
413	医用高分子講座・発生システム制御分野 再生医療、幹細胞工学、細胞生物学、発生生物学、多細胞動態、医療用デバイス	総合医療工学分野		

研究内容の詳細については <https://www.pc.t.kyoto-u.ac.jp/ja/> を参照のこと。

II. 募集人員

若干名

III. 出願資格

本募集要項 Part A 「II - i 出願資格」参照

IV. 学力検査日程

(1) 試験日時・試験科目

2月13日 (火)	10:00～12:00 英語	13:00～16:00 専門科目Ⅰ (高分子化学)
2月14日 (水)	9:00～12:00 専門科目Ⅱ (有機化学) 専門科目Ⅲ (物理化学)	13:00～ 口頭試問

(2) 試験場

桂キャンパス A2 棟 307 号室 (化学系講義室 4)

V. 入学試験詳細

(1) 学科試験

試験当日は開始 20 分前までに指定された試験室前に集合し、係員の指示に従うこと。試験開始時刻から 30 分経過したあとは入室できない。また、試験開始後、当該科目の試験時間中は退室を認めない。なお、専門科目の試験時には、受験者全員に関数電卓を貸し出す。使用できる筆記用具は、鉛筆・万年筆・ボールペン・シャープペンシル・鉛筆削り・消しゴムに限る。携帯電話、スマートウォッチ等の電子機器類は、なるべく試験室に持ち込まないこと。持ち込む場合には、電源を切り、カバンにしまって所定の場所に置くこと。身につけている場合、不正行為と見なすので注意すること。

[英語] 配点 100 点

昨年度と同様、TOEICの成績を用いず、筆記試験 (配点100点) のみで評価する。

[専門科目Ⅰ・Ⅱ・Ⅲ] 配点はⅠが 200 点、Ⅱ・Ⅲが 100 点ずつ

(2) 口頭試問

試験当日は開始 20 分前までに指定された試験室前に集合し、係員の指示に従うこと。

(3) 合格者決定方法

学科試験と口頭試問の各結果に基づき合格者を決定する。

VI. 出願要領

「I. 志望区分」を参照して、インターネット出願システムの志望情報入力画面にて志望区分を選択し、事前に志望区分の申請を行うこと。

京都大学工学部工業化学科以外の他大学・他学科を卒業見込みの留学生出願者について

京都大学工学部工業化学科以外の他大学・他学科を卒業見込み (あるいは卒業) の留学生は、志望区分で志望順位 1 位とする講座・分野の教員に必ず事前連絡すること。

また、外国の大学を卒業見込み (あるいは卒業) の場合は、志望区分で志望順位 1 位とする講座・分野の教員と事前連絡をとる前に必ずアドミッション支援オフィス (Admissions Assistance

Office/AAO) で手続きを行ってください。詳しくは、以下のホームページに掲載していますので、確認してください。

<https://www.kyoto-u.ac.jp/ja/international/students1/study1/graduate/graduateinfo/ku-aa0/index.html/>

Ⅶ. 入学後の教育プログラムの選択

修士課程入学後には5種類の教育プログラムが準備されている。入試区分「高分子化学専攻」の入試に合格することにより履修できる教育プログラムは以下の通りである。

- (1) 修士課程教育プログラム
- (2) 博士課程前後期連携教育プログラム 高度工学コース (高分子化学専攻)
- (3) 博士課程前後期連携教育プログラム 融合工学コース (物質機能・変換科学分野)
- (4) 博士課程前後期連携教育プログラム 融合工学コース (生命・医工融合分野)
- (5) 博士課程前後期連携教育プログラム 融合工学コース (総合医療工学分野)

いずれのプログラムを履修するかは、受験者の志望と入試成績に応じて決定する。合格決定後の適切な時期に志望を調査するので、合格決定後の指示に従うこと。

詳細については「I. 志望区分」を、また教育プログラムの内容については次項の「Ⅷ. 教育プログラムの内容について」を参照すること。

Ⅷ. 教育プログラムの内容について

【修士課程教育プログラム】

高分子は、現代生活を支える必需物資として、また先端科学技術を実現する機能材料として、幅広い領域に展開しており、今後も高分子が活躍する分野はますます拡大し、人間社会における重要性も増大するものと思われます。そこで、本専攻では、高分子化学をベースに先端領域での研究開発において活躍できる研究者・技術者の養成を行います。高分子の生成、反応、構造、物性、機能についての基礎的な専門知識に関する講義と実践的研究教育を通じて、高分子を基礎とする専門的知識、研究推進能力、学術的倫理性を備えた研究者、技術者を養成します。また、自ら行った研究を的確に位置づけ、その内容と成果を社会に発表できる能力を養成します。

【高度工学コース】

高分子化学専攻は、高分子の基礎的科学（合成、反応、物性、構造、機能）に関する研究を行うとともに、高分子関連の新材料創出と新たな科学技術の開発を目指し、自然と調和した人類社会の発展に貢献することを使命としています。そのため、バイオ、医療、環境、エネルギー、情報、エレクトロニクス等に関わる分野を含めて、幅広い領域に展開しています。21世紀に入って高分子が活躍する分野はますます拡大し、社会における重要性も増大しています。そこで本専攻では、幅広く正確な専門知識の修得、実践的研究教育を通じた研究の企画、提案、遂行能力の養成、研究成果の論理的説明と国際社会に発信する能力の修得、これら三つの目標を設定して教育を行い、高分子を基盤とする先端科学技術領域において国際的に活躍できる独創的な研究能力と豊かな人間性を備えた研究者、技術者を養成します。

【融合工学コース】

工学研究科 HP (<https://www.t.kyoto-u.ac.jp/ja/education/graduate/dosj69>)を参照すること。

Ⅸ. その他

試験当日受験票を忘れた受験生は速やかに A クラスター事務区教務掛へその旨を申し出ること。

問合せ先・連絡先

〒615-8510 京都市西京区京都大学桂

京都大学大学院工学研究科 A クラスター事務区教務掛

電話 075-383-2077

電子メール 090kakyomu@mail2.adm.kyoto-u.ac.jp

ホームページ <https://www.t.kyoto-u.ac.jp/ja/admissions/graduate/exam1/index.html#contact-mc>

※The Japanese language version of the information provides here is to be given precedence.

Department of Polymer Chemistry

I. Preferred Research Area

Research Area No.	Chair/Laboratory Research Overview	Applicable Courses		
		Integrated Program		Master's Course Program
		Interdisciplinary Engineering Course	Advanced Engineering Course	
401	<u>Advanced Polymer Chemistry</u> (This will not be open for applications this year.)	Materials Engineering and Chemistry Engineering for Life Science and Medicine Integrated Medical Engineering	According to the course program established by the Department of Polymer Chemistry	According to the course program established by the Department of Polymer Chemistry
402	<u>Polymer Synthesis: Functional Polymer Synthesis</u> Molecular design, Functional polymers, Supramolecular polymers, Self-assembly, Conducting polymers, Designer polymers, Colloids, Self-healing materials, Molecular recognition, Stimuli-responsive materials, Molecular machines, Gels, Soft materials			
403	<u>Polymer Synthesis: Synthetic Polymer Chemistry</u> Polymer synthesis, Precision polymerization, Living polymerization, Radical polymerization, Cationic polymerization, Functional polymers, Precision synthesis of polymers, Design of polymerization catalysts, Polymerization intermediate chemistry, Sequence control, Cyclic polymer, Amphiphilic random copolymers			
404	<u>Polymer Synthesis: Polymerization Chemistry</u> Polymerization chemistry, Synthetic organic chemistry, Elemental chemistry, Inorganic polymers, Heteroatom-containing conjugated polymers, Organic-inorganic hybrid materials, Functional polymer, Environmentally responsive polymers, Bio-related polymers, Molecular environmental sensing, Molecular imaging			
405	<u>Polymer Synthesis: Bio-macromolecular Science</u> Self-organization and functions of organism-related polymers, Bio-inspired science, Biomimetics materials, Protein technology, Glycotechnology, Gel materials engineering, Bio and medical applications, Artificial cell liposome engineering			
406	<u>Polymer Physics: Polymer Structure and Function</u> Polymer nanostructures, Optoelectronic properties of conjugated polymers, Organic thin-film solar cells, Photochemistry, Photophysics, Polymer thin films, Electron transfer, Spectroscopy	Materials Engineering and Chemistry	According to the course program established by the Department of Polymer Chemistry	According to the course program established by the Department of Polymer Chemistry
407	<u>Polymer Physics: Polymer Molecular Science</u> Polymer solution science, Optical and small-angle X-ray scattering, Elucidation of polymer solution properties via viscometry, Isolated polymers in solution, Polymer chain dynamics, and molecular level understanding of macromolecular aggregate			
408	<u>Polymer Physics: Fundamental Physical Chemistry</u> Theory, computer simulations, and experiments relating to polymer physical properties, Phase transition of polymer systems, Phase transition dynamics, Polymer rheology, Physical chemistry of gels, Crystallization mechanisms of polymer			
409	<u>Polymer Design: Polymer Materials Science</u> Polymer structure, Solid matter physics of polymers, Analysis and control of higher-order polymer structure, Phase transition dynamics of polymer systems, Neutron, X-ray, and optical scattering analysis, Optical and electron microscopes, Directed self-assembly of block copolymers, Crystalline Polymers			
410	<u>Polymer Design: Molecular Design of Polymer</u> Synthesis of polymeric materials using precision polymerization methods, Analysis of polymer structures and physical properties, Analysis of precision synthesis, Fundamentals and applications of living radical polymerizations, Surface and interface control by graft polymerization, Functional composite fine particles			
411	<u>Polymer Design: Polymer Controlled Synthesis</u> Controlled polymerization, Precision polymer synthesis, Living polymerization, Radical polymerization, Radical reactions, Cyclic π -conjugated molecules, Synthetic organic chemistry, Elemental chemistry, Functional materials, Soft materials, Crystalline polymers	Engineering for Life Science and Medicine Materials Engineering and Chemistry Integrated Medical Engineering	According to the course program established by the Department of Polymer Chemistry	According to the course program established by the Department of Polymer Chemistry
412	<u>Biomedical Polymers: Biomaterials</u> Research on design, synthesis, and evaluation of biomaterials aiming for advanced medical care, Regenerative medicine engineering (tissue engineering), Drug delivery systems (DDS), Stem cell engineering, Materials and devices for inducing regeneration, Materials and devices for medicine, Materials and devices for medical care			
413	<u>Biomedical Polymers: Developmental Systems</u> Regenerative medicine, Stem cell engineering, Cell biology, Developmental biology, Multicellular dynamics, Medical devices			

For more detailed research descriptions, visit <https://www.pc.t.kyoto-u.ac.jp/en>.

II. Enrollment capacity

A few people

III. Eligibility

Refer to Part A “II-i Eligibility” of the “Guidelines for Applicants”.

IV. Examination Schedule

(1) Date and time for the examination subjects:

February 13 th (Tue)	10:00 – 12:00 English	13:00 – 16:00 Subject Test I (Polymer Chemistry)
February 14 th (Wed)	9:00 – 12:00 Subject Test II (Organic Chemistry) Subject Test III (Physical Chemistry)	From 13:00 Oral Examination

(2) Examination venue:

Katsura Campus, Building A2, Room 307

V. Details of Entrance Examinations

(1) Academic examinations:

On the day of the examination, applicants shall be present in front of the designated room no later than 20 minutes before the examination starts. 30 minutes after the start of the examination, applicants may no longer enter the room. Furthermore, after the start of the examination, applicants are not allowed to leave the room for the duration of examination. For the Subject Tests, a scientific calculator can be lent to the applicant for the examination. Writing utensils applicants can use in the examination are limited to pencils, fountain pens, ballpoint pens, mechanical pencils, pencil sharpeners, and erasers. As far as possible, applicants should not bring electronic devices, including mobile phones and smartwatches, into the examination room. If an applicant must take an electronic device into the room, the power must be turned off, it must be placed in the applicant's bag and placed in a designated area. If applicants carry such a device with them into the examination room, it may be regarded as cheating.

[English] Distribution of points: 100 points

The TOEIC score will not be used for evaluation; only the written examination (100 points) will be used.

[Subject Tests I, II, and III] Distribution of points: 200 points for I and 100 points each for II and III.

(2) Oral examination:

On the day of the examination, applicants shall be present in front of the designated room no later than 20 minutes before the examination starts.

(3) Screening method of successful applicants:

Successful applicants are decided upon based on the results of academic and oral examinations.

VI. Instructions on Application for Admission

Applicants shall apply for the areas of choice in advance using the Internet Application System. Refer to “I. Preferred Research Area” and select the area of choice on the information entry screen of the Internet Application System.

For foreign applicants who have graduated or expect to graduate from universities other than Kyoto University

Foreign applicants who have graduated or expect to graduate from universities other than Kyoto University should consult with faculty members in charge of the laboratories for the research areas of their choice in advance. This applies to all foreign applicants, even foreign applicants who have graduated or expect to graduate from other Japanese universities.

Moreover, for foreign applicants who have graduated or expect to graduate from non-Japanese universities, they should contact the Admissions Assistance Office (AAO) for a preliminary screening to confirm eligibility and submit their application documents to the Graduate School of Engineering before contacting the faculty members in charge of the laboratories for the research areas of their choice.

For further details please visit the following site:

https://www.kyoto-u.ac.jp/en/education-campus/education_and_admissions/graduate-degree-programs/for_graduates_of_overseas_universities/for_graduates_of_overseas_universities.html

VII. Selecting Your Course after Enrollment

Five courses are provided for successful applicants after the enrollment in Master's program. Successful applicants for the "Department of Polymer Chemistry" can take the following courses.

- (1) Master's course program
- (2) Advanced Engineering Course (Department of Polymer Chemistry)
- (3) Interdisciplinary Engineering Course (Materials Engineering and Chemistry)
- (4) Interdisciplinary Engineering Course (Engineering for Life Science and Medicine)
- (5) Interdisciplinary Engineering Course (Integrated Medical Engineering)

Successful applicants' course assignment is determined based on their preference and the entrance examination results. Applicants' preferred courses will be considered in an appropriate amount of time after determining that the examination has been successfully passed. Upon receiving notification of passing the exam, please follow the instructions given.

For the details, refer to "I. Preferred Research Area." For course details refer to "VIII. Educational Programs" in the next section.

VIII. Educational Programs

[Master's Program]

Polymers have been utilized in diverse fields as essential materials that support our modern life, and also as functional materials to realize advanced science and technology. It is expected that the fields where polymers play active roles will keep growing, and the importance of polymers for human society will increase too. This Department aims at fostering researchers and engineers capable of playing active roles in the research and development in advanced fields based on polymer chemistry. Through lectures and also through the practical research and educational programs, students gain not only basic expertise in polymers, including knowledge and capabilities in polymer synthesis, reactions, structures, physical properties, and functions, but the students are also trained to become experts in their specialty, pursue and promote their research, and to approach research with a sense of academic ethics. In addition, the Department also aims at fostering researchers who are capable of understanding the place of their own research appropriately and presenting the contents and results to society.

[Advanced Engineering Course]

The Department of Polymer Chemistry conducts research on basic polymer science (synthesis, reactions, physical properties, structures, and functions), and aims to contribute to the development of human society in harmony with nature, with the goal of creating new polymer-related materials and developing new science technologies. For this reason, research activities in a wide range of fields including biotechnology, medical care, environment, energy, information, electronics, etc. are being developed. In the 21st century, polymers have been increasingly applied in a much wider range of fields, and their importance in society has also been increasing. This Department accordingly provides education with three objectives including: 1) mastering broad and precise expertise 2) cultivating capabilities to plan, propose, and conduct research through practical research and educational programs and 3) acquiring abilities to explain research outcomes logically and communicate this to the international community. Therefore, the Department aims at fostering researchers and engineers who have both rich human qualities and unique research competency strong enough to play outstanding roles in the international arena of advanced science and technology based on polymers.

[Interdisciplinary Engineering Course]

Refer to Graduate School of Engineering HP (<https://www.t.kyoto-u.ac.jp/ja/education/graduate/dosj69>) .

IX. Other

An applicant who has forgotten to bring their examination voucher on the examination day shall report it to Graduate Student Section, A Cluster Office as soon as possible.

Contact for general inquires:

Kyoto University Katsura, Nishikyo-ku, Kyoto 615-8510

A Cluster Office, Graduate Student Section, Graduate School of Engineering, Kyoto University

Phone: +81-75-383-2077

E-mail: 090kakyomu@mail2.adm.kyoto-u.ac.jp

Home page: <https://www.t.kyoto-u.ac.jp/ja/admissions/graduate/exam1/index.html#contact-mc>