

化學 (CHEM)

課程重點

化學系學生會修讀各方面的化學知識和接觸其相關的領域。基本課程包括：分析化學、無機化學、有機化學以及物理化學。專門課程包括：環境化學、醫學化學、生物化學、高分子化學、材料化學（包括納米結構及先進檢測）、高級計算及理論化學。

此主修課程提供下列四個專修科目：

- 生物分子化學
- 環境及分析化學
- 材料化學
- 純化學

化學系課程為學生提供全面的分析力和解難能力訓練。課程中涵蓋分析化學、無機化學、有機化學、物理化學以及現代實驗室技能等的基本訓練；課程的靈活度高，讓學生可按自身的能力決定學習的專業領域。

就業前景

化學系的畢業生可成為政府或私營實驗室的化驗師及技術員、教師、環境評估顧問、化學工程師、中醫藥研究員、製藥實驗室化學家、實驗室儀器或電腦供應商的市場銷售員、科技專利主任、撰稿員、科學期刊或雜誌的記者，以及在本地或海外大學繼續深造。



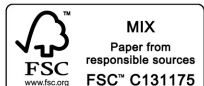
香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

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Research Highlights

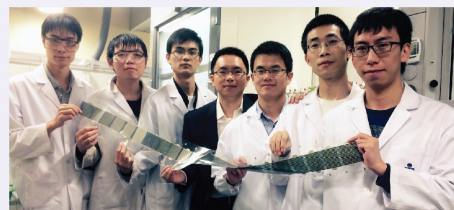
Professor Benzhong Tang FRSC, MCAS

Prof. Tang's important contributions to basic knowledge include his pioneering work on the discovery of a new photophysical phenomenon called aggregation-induced emission (AIE), which is the exact opposite of the aggregation-caused quenching (ACQ) effect written in textbooks. This seminal discovery has changed people's way of thinking on the luminescent processes in the aggregated state and has attracted much interest among scientists and technologists.



Professor Henry Yan

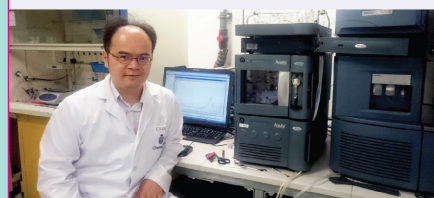
Prof. Yan's research focuses on the development of low-cost and environmentally friendly solar cell technologies. Although conventional silicon-based solar cells can achieve high efficiencies, their production uses complicated and costly processes. Therefore, intensive research efforts have been devoted into developing a new generation of organic solar cells that can be produced in a fashion similar to the printing of newspapers. His group is one of the leading research groups in this field and has produced several cases of world-record performances for organic solar cells in recent years.



Professor Henry Yan (center) with his research group, holding a film of their latest organic solar cells.

Professor Simon Chan

Prof. Chan is an alumnus of HKUST Chemistry Department, he studied his BSc degree here and returned to lead a research group after further studies in the USA. Prof. Chan and his team recently used advanced mass spectrometry tools to unravel the root cause of an endemic kidneys disease in the Balkan Peninsula, by demonstrating with Chemistry where



the nephrotoxic substances originated and how they entered human food chain. This award-winning research will help to save many people's lives.

Applying to study BSc in Chemistry

Under our School-based admission, students interested in the Bachelor of Science (BSc) in Chemistry program will be admitted into the School of Science in their first year. Prospective JUPAS students may apply either to the **Science Program - Group B (JS5103)** or the **International Research Enrichment (IRE) program (JS5011)**, targeted at students who wish to pursue a research career. After one year of study, students will declare a major program of choice, such as Chemistry. For further details, visit <http://science.ust.hk>

Admission Requirement

In addition to the general entrance requirements of the University, acceptable grades are required for HKDSE students in:

at least one HKDSE science subject
(including Mathematics Extended M1/M2)

Pre-major Requirement

Students must take these courses to enter the Chemistry Major:

One of:	General Chemistry IA CHEM1010	3 credits
	General Chemistry IB CHEM1020	3 credits
And	General Chemistry II CHEM1030	3 credits

Career prospects

- Chemists or technicians in Government laboratories or private accredited laboratories
- School teachers
- Environmental consultants
- Chemical engineers
- Chinese medicine researchers
- Work in a pharmacy or the pharmaceutical sector
- Marketing representatives for lab equipment suppliers or for computer companies
- Scientific patent officers
- Script writers
- Reporters for science journal or magazines
- Researcher in Chemistry with postgraduate studies
- Postgraduates to pursue taught or research degree in both local and overseas universities

Our department offers Research Postgraduate degrees (MPhil and PhD) as well as a Taught Postgraduate degree (MSc in Analytical Chemistry) for students who aspire to take on further studies after their first degree.



香港科技大學
THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

化學系
DEPARTMENT OF CHEMISTRY

Studying

CHEMISTRY

at

HKUST





Chemistry

Chemistry involves the study of the composition, properties and structures of substances, and the reactions that substances undergo. It has become truly "the central science" since its activities intimately involve areas such as molecular biology, molecular physics, materials science, molecular engineering, biotechnology, environmental science, drug design, nuclear medicine and others.



The Chemistry Department

The mission of the department is to offer research and instructional opportunities in the emerging areas of chemistry while maintaining a program rooted in the basics of the discipline.

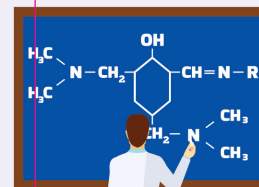


The Department of Chemistry at HKUST has been ranked at **no. 22** in the QS World University Rankings by subject 2019.

QS Rankings are rated in research, teaching, internationalization, specialist criteria, employability, facilities, innovation and access.



Chemistry Undergraduate Program



The Chemistry Undergraduate Program at HKUST provides an excellent general training in analytical thinking and problem solving, and prepares students for employment in areas of chemical science, education and technology, or to further study in graduate research.

The **curriculum**, which includes basic training in analytical, inorganic, organic and physical chemistry as well as modern laboratory techniques and skills, has been designed to give students flexibility in determining the extent of their specialization.



Our **Departmental Undergraduate Faculty Mentor Scheme** provides tailored assistance to each individual to solve problems in relation to his/her study and career decision. The university and the department also have excellent connections with overseas universities to enable students to participate in exchange programs, a very popular option.



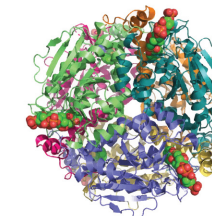
SPECIALIZE IN AN AREA BY CHOOSING A CHEMISTRY OPTION

Student may opt to graduate with or without an option. We have a few options for students to choose according to their own interest. Given below are three examples.

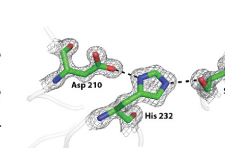
Biomolecular Chemistry Option

This option focuses on the Chemistry that occurs within a living cell. Students will learn the fundamental principles governing the structures, properties and functions of biologically important molecules, such as nucleic acids and proteins. They will also learn to work with these biomolecules in the laboratory using modern techniques and equipment.

Those studying this option will not only increase their employability in the sectors relating to life sciences, but they will also gain a deeper appreciation of the biomolecular processes occurring in the human body and in nature.



The structure of an enzyme
(MenB, a crotonase fold enzyme)



Catalytic triad of a serine protease
(MenH, an α/β -hydrolase fold enzyme)

Materials Chemistry Option

Materials Chemistry is a highly active area and fast-growing field. Chemists are playing an increasingly important role in the design and synthesis of new materials with desirable and innovative properties. Students in this option will be able to explore the Chemistry of many exciting materials that have real application in the modern world, such as organic light emitting diodes, different functional polymers, highly efficient organic solar cells and novel luminescent materials. They will also have the chance to prepare and study some of these interesting materials in the laboratory.

Our department has a high reputation for research in Materials Chemistry and in this option, students will meet the professors who are pioneers in this field. For instance, the novel aggregation-induced emission (AIE) phenomenon was discovered at HKUST and a world-record in organic solar cell efficiency was achieved recently in our laboratories.

The well-known aggregation-caused quenching (ACQ) effect [TOP] and the novel aggregation-induced emission (AIE) phenomenon [BOTTOM]



NON-AGGREGATED MOLECULES

AGGREGATED STATE



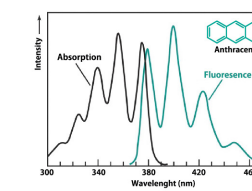
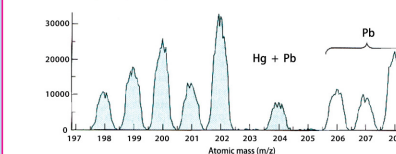
Environmental and Analytical Chemistry



Liquid Chromatography-Mass spectrometer



PM2.5 Air Sampler for air quality analysis



This option deals with the qualitative and quantitative characterization of different materials and mixtures. Sound analytical measurements underpin our understanding of many important health and environmental issues, such as air and water pollution, carbon dioxide emission and chemical contamination of food or water supplies.

Students studying this option will receive training in the fundamental principles as well as the practical skills of chemical analysis, which would prepare them to confront and solve environmental and analytical problems.