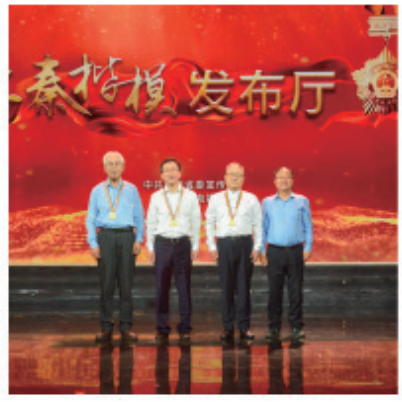
陕西师范大学 SHAANXI NORMAL UNIVERSITY

化学化工学院 School of Chemistry & Chemical Engineering

新概念传感器与分子材料研究院 INSTITUTE OF NEW CONCEPT SENSORS AND MOLECULAR MATERIALS

新概念传感器与分子材料研究院 简报 05 2024

Institute of New Concept Sensors and Molecular Materials Newsletter



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国家重点研发计划“纳米前沿”重点专项 2024 年度推进会召开

2024 Key Special Project promotion meeting of Nano Frontier National Key R&D Plan held

2024 年 5 月 10 日，国家重点研发计划“纳米前沿”重点专项项目“超高灵敏检测痕量危险有害化学物质的纳米材料与技术”2024 年度推进会在陕西师范大学新概念传感器与分子材料研究院报告厅召开。

会议由中国科学院新疆理化技术研究所牵头，联合陕西师范大学、中国人民解放军军事科学院防化研究院、中国科学院化学研究所、公安部禁毒情报技术中心、深圳砺剑防卫技术有限公司等单位共同举办，项目各承担单位负责人、部分科研骨干、新疆理化所科技处和陕西师范大学科技处负责人等近 40 人参加了会议，会议由陕西师范大学丁立平教授主持。

会上，项目组各课题负责人对本课题 2024 年度考核指标完成情况及重要进展进行了汇报，并对存在问题进行了梳理。项目组成员就研究进展、考核指标完成情况、现存问题及解决方法、下一年度研究计划等方面进行了讨论，并提出建设性意见。项目组成员表示，要持续加强课题间


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汇报人：丁立平 教授
2024年5月10日


TATP及常规氧化剂的精准区分，为解决常规器件区分感知能力不足提供了良好基础
便携式双模检测器件研制

的合作交流，以项目的优秀结题为目标，共同做出有显著成果的工作。

项目负责人窦新存研究员表示，首先要注重材料的创新，做出有显示度的、顶尖的工作；其次要以超越国内外业界水平为目标，做好装备的集成开发。

房喻院士在总结发言中对项目组成员进行了鼓励和鞭策。他表示项目团队的目标应不止于完成任务，还要高标准、严要求，关键是做好、做亮，要从应用一线亟待解决的实际问题出发，在解决问题的过程中形成核心技术。

On May 10, 2024, the 2024 annual promotion meeting of the Key Special Project "Nanomaterials and Technologies for Ultra-sensitive Detection of Trace Hazardous and Harmful Chemicals" of "Nano Frontier" National Key Research and Development Plan was held in the lecture hall of the Institute of New Concept Sensors and Molecular Materials of Shaanxi Normal University.

The meeting was organized by Xinjiang Technical Institute of Physics and Chemistry of the Chinese Academy of Sciences and co-organized by Shaanxi Normal University, Chemical Defense Research Institute of the PLA Academy of Military Sciences, Institute of Chemistry of the Chinese Academy of Sciences, Anti-Drug Information Technology Center of the Ministry of Public Security, and Shenzhen SRED Security and Surveillance Technology Co., Ltd. Nearly 40 people, including heads of project undertaking units, backbone researchers, and heads of the Science and Technology Department of Xinjiang Technical Institute of Physics and Chemistry and Shaanxi Normal University, attended the meeting, which was chaired by Prof. Ding Liping of Shaanxi Normal University.

At the meeting, the sub-project leaders reported the completion of the 2024 annual assessment indicators and important progress of the project, and sorted out the existing problems. Members of the project teams discussed the research progress, the completion of assessment indicators, existing problems and solutions, and the next year's research plan, and put forward constructive suggestions. The members of the project teams said that it is necessary to continue to promote the cooperation and exchange between the teams, take the excellent conclusion of the project as the goal, and jointly deliver remarkable results.

Project leader Prof. Dou Xincun said that project teams should first give priority to the innovation of materials to achieve more visible and top-tier results, and secondly, they should aim to surpass the level of domestic and foreign industry and do a good job in the integrated development of equipment.

Prof. Fang Yu congratulated and encouraged the members of the project teams in his concluding speech. He said that the goal of the project teams should not be limited only to completing the project tasks, but they should set high standards and strict requirements, and starting from the practical problems that need to be solved, form core technologies in the process of solving the problems and do more remarkable work.

英国女王大学 Amilra Prasanna de Silva 教授应邀来院授课

Prof. AP de Silva of Queen's University invited to teach a lecture course

2024 年 5 月 7 日至 9 日，英国皇家科学院院士、英国北爱尔兰女王大学 Amirla Prasanna de Silva 教授应邀为新概念传感器与分子材料研究院师生开展了题为“Fluorescent Signalling and Molecular Logic Systems”的学术讲座课程。

AP de Silva 教授首先介绍了荧光原理和 PET 设计传感应用，并详细阐述了选择性检测钠离子和钾离子的荧光传感器。最后他还分享了分子逻辑系统相关知识，通过简单逻辑门衍生出多种有效的分子逻辑类型，收集和处理相关信息并构建成相应的分子逻辑系统，从而实现对目标分子的精确

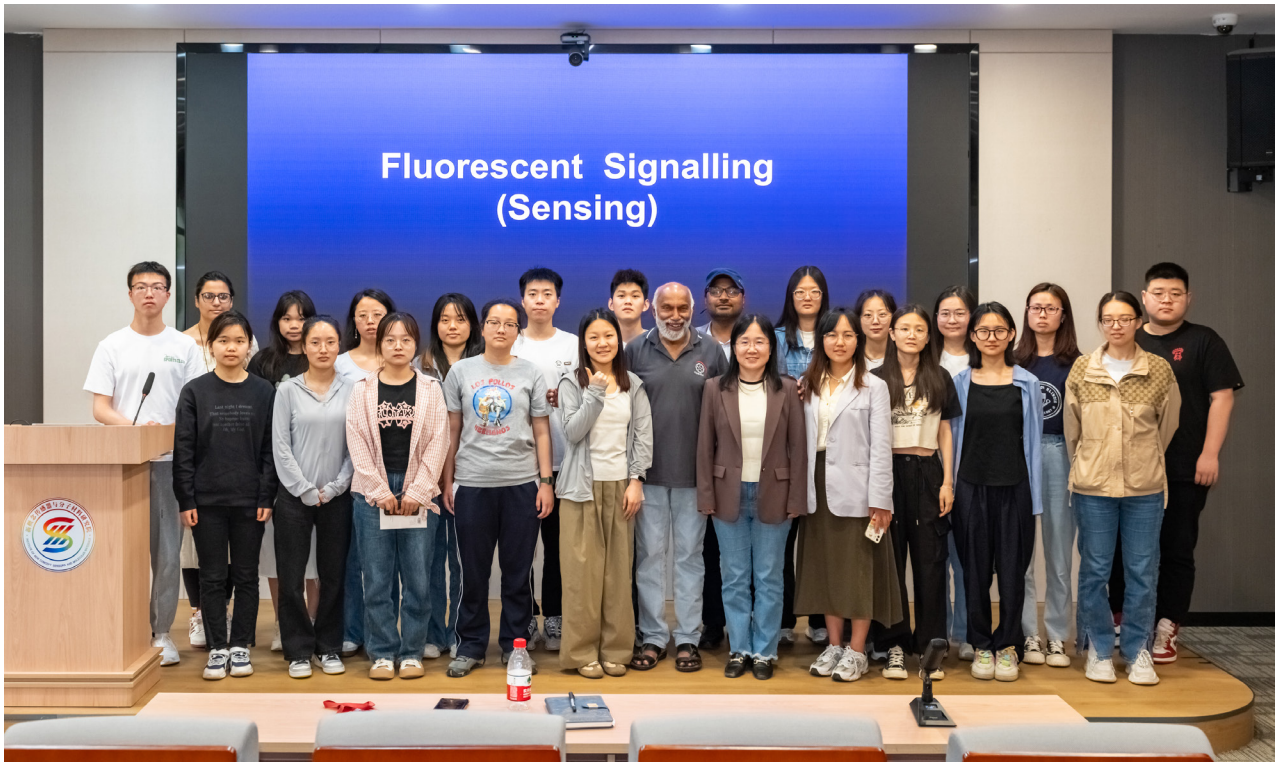
传感。

本次课程由副院长丁立平教授主持，研究院和化学化工学院教师及 40 余名研究生参加了此次课程学习，并与 AP de Silva 教授进行了交流讨论。

Member of the Royal Academy of Sciences Prof. Amirla Prasanna de Silva of Queen's University, Northern Ireland, UK, was invited to teach an academic lecture course titled "Fluorescent Signalling and Molecular Logic Symbol Systems" for teachers and students of the Institute of New Concept Sensors and Molecular Materials.

Prof. AP de Silva firstly introduced the principle of fluorescence and the application of PET design sensing, and explained the fluorescent sensors for selective detection of sodium and potassium ions. He also shared the knowledge of molecular logic systems, in which relevant information is collected and processed through simple logic gates derived from a variety of effective types of molecular logic, and corresponding molecular logic systems are built, so as to realize the precise sensing of the target molecules.

The course, hosted by INCSMM vice dean Prof. Liping Ding, was attended by teachers and more than 40 postgraduates from the Institute and the School of Chemistry and Chemical Engineering, who exchanged ideas and discussed with Prof. AP de Silva.



房喻院士出席《中国科学：化学》2024 年度全体编委会并致辞

Fang Yu speaks at 2024 Editorial Board Meeting of Science China: Chemistry

2024 年 5 月 18 日，《中国科学：化学》2024 年度全体编委会在西安召开，房喻院士受邀出席并致辞。

本次会议由《中国科学》杂志社主办、陕西师范大学承办。主编万立骏院士，副主编李永舫院士、谭蔚泓院士、田禾院士、田中群院士、赵宇亮院士，以及韩布兴院士、杨金龙院士、岳建民院士等编委和青年编委共 80 余人参加了会议。中国科学院学部工作局王笃金局长、《中国科学》《科学通报》编委会秘书长彭斌编审受邀出席并致辞。万立骏主编为 2023 年优秀编委、优秀青年编委和优秀论文作者颁发了荣誉证书。

On May 18, 2024, Prof. Fang Yu was invited to attend and speak at the 2024 editorial board meeting of Science China: Chemistry held in Xi'an.

The meeting was organized by Science China Press and hosted by Shaanxi Normal University. More than 80 people attended the meeting, including editor-in-chief Chinese Academy of Sciences academician Wan Lijun, deputy chief editors academicians Li Yongfang, Tan Weihong, Tian He, Tian Zhongqun, Zhao Yuliang, as well as editorial board members such as academicians Han Buxing, Yang Jinlong, Yue Jianmin, and other young editorial board members. Mr. Wang Dujin, director of CAS Faculty of Sciences Work Bureau, and Mr. Peng Bin, secretary general of Editorial Board of Science China and Science Bulletin, were invited to attend the meeting and delivered speeches. Wan Lijun presented honorary certificates to the outstanding editorial board members, outstanding young editorial board members and outstanding paper authors in 2023.

房喻院士及研究院师生参加中国科学院学部智能化学论坛

Fang Yu and INCSMM teachers and students attend Intelligent Chemistry Forum of CAS Faculty of Sciences

2024 年 5 月 17 至 19 日，中国科学院学部第 161 次科学与技术前沿论坛—智能化学论坛在陕西师范大学新勇学生活动中心召开，房喻院士担任论坛共同召集人，与新概念传感器与分子材料研究院师生一同参加论坛。

本次论坛由中国科学院化学部、中国科学院学部学术与出版工作委员会承办，《中国科学》杂志社、陕西师范大学协办。中国科学院院士万立骏、房喻共同担任论坛召集人，陕西省政协副主席孙科、陕西师范大学副校长周正朝出席了开幕式。

论坛围绕“智能化学新方法和新技术”“智能分子材料”“智能化学系统及其应用”三个议题，邀请了赵宇亮院士、杨金龙院士等 18 位专家学者作报告，展示了智能方法、技术在化学前沿基础研究和化学材料设计等方面的创新成果。来自全国 40 多个高校和科研院所的 60 余位专家参加研讨，同时来自陕西师范大学等校的 200 余位师生聆听了报告。

闭幕式上，房喻院士强调化学进入智能时代，科学研究范式有所变化，年轻一代要关注学科发展动态，促进智能技术与化学研究的融合。

From May 17 to 19, 2024, the 161st Frontier Forum of Science and Technology of the Faculty of Sciences of Chinese Academy of Sciences - Intelligent Chemistry Forum was held in Xinyong Student Activities Center of Shaanxi Normal University. Prof. Fang Yu served as the co-convener of the forum and attended the forum together with the teachers and students of the Institute of New Concept Sensors and Molecular Materials.

The forum was organized by the

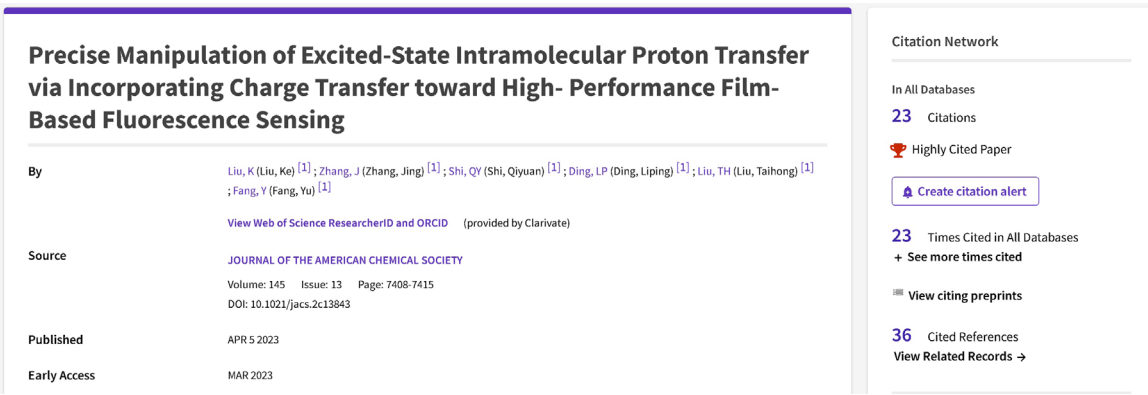
Chemistry Department of the Chinese Academy of Sciences, the Academic and Publication Working Committee of CAS Faculty of Sciences, and co-organized by Science China Press and Shaanxi Normal University. CAS academicians Wan Lijun and Fang Yu served as co-conveners of the forum. Sun Ke, vice chairman of the Shaanxi Provincial People's Political Consultative Conference, and Zhou Zhengchao, vice president of Shaanxi Normal University attended the opening ceremony.

Centering on the three topics of "New Methods and Technologies of Intelligent Chemistry", "Intelligent Molecular Materials" and "Intelligent Chemical Systems and Their Applications", 18 experts and scholars including CAS academicians Zhao Yuliang and Yang Jinlong were invited to make presentations, demonstrating the innovative achievements of intelligent methods and technologies in the basic research of chemical frontiers and the design of chemical materials. More than 60 experts from more than 40 universities and research institutes attended the forum, while more than 200 teachers and students from Shaanxi Normal University and other universities listened to the reports.

At the closing ceremony, Fang Yu said that chemistry has entered the age of intelligence, the paradigm of scientific research has changed, and the younger generation should pay attention to the new development of the discipline and promote the integration of intelligent technology and chemical research.

刘科博士论文入选 ESI 高被引论文

Dr. Liu Ke's paper selected as an ESI Highly Cited Paper



Precise Manipulation of Excited-State Intramolecular Proton Transfer via Incorporating Charge Transfer toward High- Performance Film-Based Fluorescence Sensing

By: Liu, K (Liu, Ke) [1] ; Zhang, J (Zhang, Jing) [1] ; Shi, QY (Shi, Qiyuan) [1] ; Ding, LP (Ding, Liping) [1] ; Liu, TH (Liu, Taihong) [1] ; Fang, Y (Fang, Yu) [1]

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近期，新概念传感器与分子材料研究 2023 年出站的博士后刘科博士发表在美国化学会志上的论文 Precise Manipulation of Excited-State Intramolecular Proton Transfer via Incorporating Charge Transfer toward High-Performance Film-Based Fluorescence Sensing (J. Am. Chem. Soc., 2023, 145, 7408-7415) 入选 ESI 高被引论文，引用期刊包括 JACS, Angew. Chem. Int. Ed., Adv. Sci. 等。

该工作以激发态分子内质子转移片段为受体结构，通过引入分子内跨空间电荷作用，发展了一种激发态质子转移的分子内电荷作用调控新机制。基于该工作所构建的荧光传感薄膜体系可实现 2- 氯乙基硫醚气体（芥子气模拟物）的高效检测。

陕西师范大学为该论文唯一署名单位。论文第一作者刘科博士现已入职西北农林科技大学从事教学科研工作。

Recently, the paper Precise Manipulation of Excited-State Intramolecular Proton Transfer via Incorporating Charge Transfer toward High-Performance Film-Based Fluorescence Sensing (J. Am. Chem. Soc., 2023, 145, 7408-7415) published in 2023 in the Journal of the American Chemical Society by Dr. Liu Ke, a Postdoctoral Fellow of the Institute of New Concept Sensors and Molecular Materials, was selected as an ESI Highly Cited Paper, with citations from journals such as JACS, Angew. Chem. Int. Ed., Adv. Sci.

This work develops a new mechanism of intramolecular charge interaction modulation of excited state proton transfer by introducing intramolecular cross-space charge interaction using excited state intramolecular proton transfer fragments as receptor structures. The fluorescent sensing film system constructed based on this work can realize the efficient detection of 2-chloroethyl sulfide gas (mustard gas simulant).

The sole author unit of the paper is Shaanxi Normal University, and the first author Dr. Ke Liu is now employed at Northwest Agriculture and Forestry University.

房喻院士做客“曲江讲坛”作报告

Fang Yu delivers speech at "Qujiang Forum"

2024 年 5 月 22 日下午，房喻院士应邀做客“曲江讲坛”第 107 期暨名师系列第 7 讲，在陕西师范大学新勇活动中心作题为“教育: 个人的希望，民族的未来”的专题报告。

报告会由陕西师范大学研究生院（党委研究生工作部）主办，副校长杨祖培主持，400 余名优秀研究生参加了报告会。

报告中，房喻院士结合自己培养的多名研究生从出身寒门到不断成长为国家科技人才骨干的育人实践、老一辈科学家投身科学研究事业以及发达国家对教育的重视等教育实践案例，强调了教育对个人成长、民族振兴、国家富强甚至整个人类文明发展的重要性，鼓励与会研究生要以民族复兴为己任，把个人理想和国家需求相结合，助力教育强国建设。

On May 22, 2024, Prof. Fang Yu was invited to the 107th session of "Qujiang Forum" and the 7th Lecture of the Famous Teacher Series to deliver a speech titled "Education: Hope for the Individual and Future for the Nation" in Xinyong Student Activities Center of Shaanxi Normal University.

Hosted by the SNNU Graduate School (Graduate Work Department of SNNU Party Committee) and presided over by vice president Yang Zupei, the session was attended by more than 400 outstanding graduate students.

In his speech, Fang Yu combined the educational practices of his graduate who were from humble backgrounds and grew up to become national scientific and technological talents, with the cases of the older generation of scientists who devoted themselves to scientific research and the importance of education in developed countries, to emphasize the importance of education to personal growth, national revitalization, national prosperity and even the entire development of human civilization, and encouraged the graduate students attending the session to take the rejuvenation of the Chinese nation as their own responsibility, and combine their personal ideals with the needs of the country to help the construction of a strong nation through education.

房喻院士亮相《三秦楷模发布厅》“致敬科学家精神”主题节目

Fang Yu acclaimed as "Sanqin Role Model" in TV program honoring spirit of scientists

2024 年 5 月 30 日，陕西卫视播出由中共陕西省委宣传部、陕西广播电视台共同主办的《三秦楷模发布厅》“致敬科学家精神”主题节目，房喻院士亮相节目，讲述自己和所带领的团队践行科学家精神，艰苦钻研、勇攀高峰的事迹。

除了房喻院士，本期《三秦楷模发布厅》还宣传发布了中国科学院张卫红院士和中国工程院刘加平院士“绿色建筑全国重点实验室”团队的先进事迹，表彰他们勇当科技自立自强排头兵，称赞他们是时代的希望，是中国之脊梁，号召广大科技工作者以他们为榜样，弘扬科学家精神，为高水平科技自立自强贡献力量。

新概念传感器与分子材料研究丁立平教授、刘静教授、刘凯强教授、刘太宏副教授和博士后黄蓉蓉、博士研究生丁南南、翟宾宾等在节目中讲述了房喻老师对自己以身作则、言传身教的榜样故事。

陕西广电融媒体集团主持人李甜甜担任楷模事迹讲述人，全国演播艺术家海茵担任楷模精神阐释人。

阐释词写道：“房喻胸怀祖国，服务人民。四十载科研之路，你淡泊名利，潜心研究。在航天、安防、缉毒等“硬核”领域勇攀高峰，用技术感知危险，用使命化解危机。你是化学领域的“探险家”，用“中国智造”为国家安全、人民幸福保驾护航！”

今年的 5 月 30 日，是第八个“全国科技工作者日”。习近平总书记指出，在中华民族伟大复兴的征程上，一代又一代科学家心系祖国和人民，不畏艰难，无私奉献，为科学技术进步、

人民生活改善、中华民族发展作出了重大贡献。科技工作者要担当起科技创新的重任，加强基础研究和应用基础研究，打好关键核心技术攻坚战，培育发展新质生产力的新动能。

On May 30, 2024, Shaanxi Satellite TV broadcast the "Tribute to the spirit of scientists" theme program in the "Sanqin Role Model" series, which was co-sponsored by the Publicity Department of the CPC Shaanxi Province Committee and the Shaanxi Radio and Television Station, and Prof. Fang Yu appears on the program and told the story of himself and his team practicing the spirit of scientists, working hard and scaling new heights.

In addition to Prof. Fanyu, appearing on this issue of the "Sanqin Role Model" series were Chinese Academy of Sciences academician Zhang Weihong and Chinese Academy of Engineering academician Liu Japing's National Key Laboratory of Green Buildings team. They were commended for their roles as pioneers in scientific and technological self-reliance and self-improvement, and were praised as the hope of the times, the spine of China, and the Chinese scientific and technological workers are called to follow their example, carry forward the spirit of scientists, and contribute to the high level sci-tech self-reliance and self-improvement of China.

Institute of New Concept Sensors and Molecular Materials Prof. Ding Liping, Prof. Liu Jing, Prof. Liu Kaiqiang, A/Prof. Liu Taihong and Postdoc Huang Rongrong, PhD students Ding Nannan and Zhai Binbin also appear on the program telling stories about the exemplary role model of Prof. Fang Yu.

Li Tiantian, anchor of Shaanxi Radio and Television Covergence Media Group acted as the narrator of the exemplary deeds, and Hai Yin, a national performing artist, acted as the interpreter of the exemplary spirit.

The elucidating words read: "Fang Yu keeps the motherland in mind and serves the people. Forty years on the road of scientific research, you are indifferent to fame and fortune, dedicated to research. In aerospace, public security, drug enforcement and other 'hard core' fields, you dare to climb the peak, using technology to sense danger, resolving crisis with mission. You are the 'explorer' in the field of chemistry, and you use 'China's Smart Manufacturing' to escort national security and people's happiness!"

This year's 30 May is the eighth National Day of Science and Technology Workers. General Secretary Xi Jinping pointed out that on the journey of the great rejuvenation of the Chinese nation, generation after generation of scientists have devoted themselves to the motherland and people, braving difficulties and making selfless sacrifices, and have made significant contributions to the progress of science and technology, the improvement of people's lives, and the development of the Chinese nation. Science and technology workers should take up the important responsibility of scientific and technological innovation, strengthen basic research and applied basic research, fight the battle of key core technologies, and cultivate new driving forces for the development of new quality productivity.

研究院 2024 届本科生通过毕业论文答辩

Class 2024 undergraduate students pass graduation thesis defense

2024 年 5 月 31 日，新概念传感器和分子材料研究院 2024 届本科毕业生的毕业论文答辩在研究院报告厅和会议室举行，共有来自化学（创新实验班）、化学（笃学班）、化学（公费师范班）、化学（普通师范班）和应用化学班等 6 个班级的 32 位同学参与了答辩。同学们陈述了自己本科毕业设计工作的相关结果与总结，经答辩委员会评委专家对研究课题和答辩情况的质询、评议和点评，32 位同学都通过了毕业论文答辩。

On May 31, 2024, the graduation thesis defense of the Class of 2024 undergraduate students of the Institute of New Concept Sensors and Molecular Materials was held in the lecture hall and meeting room of the Institute. A total of 32 students from 6 classes, including Chemistry (innovative experimental class), Chemistry (Duxue class), Chemistry (public funded teacher-training class), Chemistry (general teacher-training class) and Applied Chemistry class participated in the defense. The students presented the results and conclusions of their undergraduate graduation design work. After defense committee members' questions, comments and evaluation on the research topics and defenses, all 32 students passed the graduation thesis defense.

房喻院士参加普通高中科学类教材评估工作研讨会

Fang Yu attends seminar on evaluation of senior high school science textbooks

2024 年 5 月 11 日，房喻院士应邀赴北京参加普通高中科学类教材评估工作研讨会。会议听取了与会院士、有关专家对各学科教材评估报告的意见建议，并研讨中小学科学类教材评估指标体系说明框架。

On May 11, 2024, Prof. Fang Yu was invited to attend a seminar on the evaluation of science textbooks for senior high schools in Beijing. The meeting listened to the opinions and suggestions of the participating academicians and experts on the evaluation report of teaching materials in various disciplines, and discussed the framework of the evaluation index system of science teaching materials in primary and secondary schools.

房喻院士担任陕西省级“双一流”建设评审专家

Fang Yu serves as Shaanxi provincial “Double First-class” Construction assessment expert

2024 年 5 月 15 日，房喻院士应邀担任评审专家，出席陕西省教育厅组织的第二轮省级“双一流”建设情况现场陈述会。

On May 15, 2024, Prof. Fang Yu was invited to serve as a assessment expert in the field presentation meeting of the second round of Shaanxi provincial “Double First-class” construction organized by Shaanxi Provincial Education Department.

房喻院士出席 2024 年西安杰出青年科技人才评审会

Fang Yu attends Evaluation Meeting of 2024 Xi'an Outstanding Young Sci-tech Talents

2024 年 5 月 16 日，房喻院士出席 2024 年西安杰出青年科技人才评审会，并介绍评审工作程序。

On May 16, 2024, Prof. Fang Yu attended the 2024 Xi'an Outstanding Young Scientific and Technological Talents Evaluation Meeting and introduced the evaluation procedures.

研究院硕士生周志杰获基金委资助赴法国攻读博士学位

Master's student Zhou Zhijie funded by CSC to pursue doctorate in France

近日，国家留学基金委公布了 2024 年国家建设高水平大学公派研究生项目录取人员名单，新概念传感器与分子材料研究院硕士研究生周志杰（导师彭浩南教授）获公派出国留学资格，拟赴法国图卢兹大学攻读博士学位。

Recently, China Scholarship Council announced the list of approved applicants for the government-funded study abroad graduate program of National Construction of High-level universities in 2024, and Zhou Zhijie, a master's student of the Institute of New Concept Sensors and Molecular Materials supervised by Prof. Peng Haonan, has been awarded the qualification for pursuing a doctorate in the University of Toulouse, France.

房喻院士获聘《大学化学》第七届编委会顾问

Fang Yu appointed consultant of 7th Editorial Committee of University Chemistry

近日，房喻院士获聘《大学化学》第七届编委会（2024–2029）顾问。《大学化学》创刊于 1986 年，是由教育部主管、北京大学和中国化学会共同主办，唯一专门面向我国高等化学教育的国家级教学类期刊。

Recently, Prof. Fang Yu was appointed as an consultant of the 7th Editorial Committee of University Chemistry (2024-2029). University Chemistry, founded in 1986, is the only state-level teaching journal for higher chemistry education in China, which is supervised by the Ministry of Education and co-sponsored by Peking University and the Chinese Chemical Society.

房喻院士出席院士聚长安・共谋发展新质生产力研讨会

Fang Yu attends Seminar of Academicians Meeting in Xi'an for Developing New Quality Productivity

2024 年 5 月 31 日，房喻院士出席“院士聚长安·共谋发展新质生产力”研讨会。此活动由陕西省科协联合中国产学研合作促进会、陕西省发改委、陕西省科技厅、陕西省工商联等单位共同主办，是全国科技工作者日陕西省重点活动。

On May 31, 2024, Prof. Fang Yu attended the "Seminar of Academicians Meeting in Xi'an for Developing New Quality Productivity" and academician expert enterprise activity. This event was co-sponsored by Shaanxi Provincial Association for Science and Technology and China Association for Promotion of Industry-University-Research Cooperation, Shaanxi Provincial Development and Reform Commission, Shaanxi Provincial Department of Science and Technology, and Shaanxi Provincial Federation of Industry and Commerce, and is the key activity of National Science and Technology Workers Day in Shaanxi Province.

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Regular Article

Self-adhesive, surface adaptive, regenerable SERS substrates for in-situ detection of urea on bio-surfaces

Yan Luo [a], Binbin Zhai [a], Min Li [a], Wenjingli Zhou [a], Jinglun Yang [b], Yuanhong Shu [a,*], Yu Fang [a,*]

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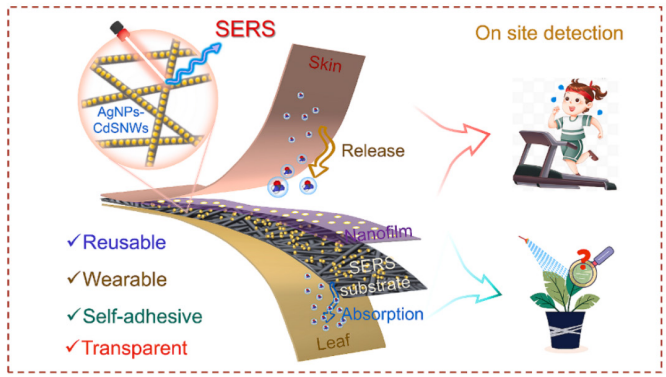
用于生物表面尿素原位检测的自粘、表面自适应、可再生 SERS 基板

Yan Luo, Binbin Zhai, Min Li, Wenjingli Zhou, Jinglun Yang, Yuanhong Shu*, and Yu Fang*. J. Colloid Interface Sci., 2024, 660, 513-521.



可穿戴 SERS 基板在健康监测和其他应用中获得了大量关注。目前的设计通常依赖于传统的聚合物基材，由于需要额外的粘合剂层，导致不适和复杂性。为了解决这些问题，我们通过在制备的纳米膜 (AgNPs–CdSNWs/ 纳米膜) 表面生长的 CdS 纳米线 (CdSNWs) 上沉积银纳米颗粒 (AgNPs–CdSNWs/ 纳米膜)，制备了一种灵活、均匀、超薄、透明和多孔的 SERS 衬底。

与文献中报道的可穿戴 SERS 基板不同，这项工作中提出的基板可以自粘附到各种表面，从而简化了结构，增强了舒适性并提高了性能。重要的是，开发的新型 SERS 基板具有良好的稳定性和可重复使用性。测试表明，衬底具有 4.2 × 107 的增强因子 (EF)，对罗丹明 6G (R6G) 的检测限 (DL) 达到了 1.0×10^{-14} M，这是文献中报道的可穿戴 SERS 衬底中观察到的最高记录之一。

此外，该底物能够实时、现场可靠地监测人体汗液和植物叶片中的尿素动态，表明其在健康分析和精准农业中的适用性。

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通讯作者：陕西师范大学房喻院士、舒远红博士
全文链接：https://doi.org/10.1016/j.jcis.2024.01.068

Wearable SERS substrates have gained substantial attention for health monitoring and other applications. Current designs often rely on conventional polymer substrates, leading to discomfort and complexity due to the need of additional adhesive layers. To address the issues, we fabricate a flexible, uniform, ultrathin, transparent and porous SERS substrate via depositing Ag nanoparticles (AgNPs) onto the CdS nanowires (CdSNWs) grown on the surface of a prepared nanofilm (AgNPs-CdSNWs/ nanofilm). Unlike the wearable SERS substrates reported in literature, the one presented in this work is self-adhesive

to a variety of surfaces, which simplifies structure, enhances comfort and improves performance.

Importantly, the new SERS substrate as developed is highly stable and reusable. Artificial sample tests revealed that the substrate showed a great enhancement factor (EF) of 4.2×107 and achieved a remarkable detection limit (DL) of 1.0×10-14 M for rhodamine 6G (R6G), which are among the highest records observed in wearable SERS substrates reported in literature.

Moreover, the substrate enables at real-time and in-situ reliable monitoring of urea dynamics in human sweat and plant leaves, indicating its applicability for health analysis and in precision agriculture.

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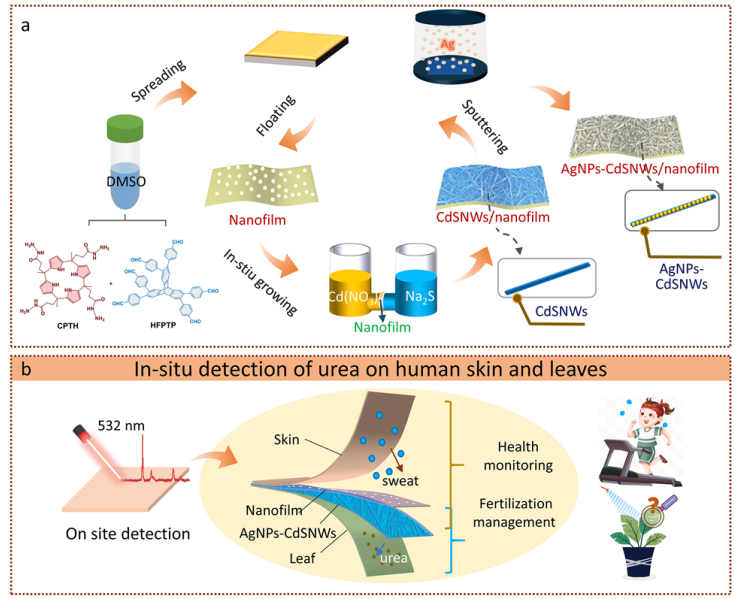


图 1. (a) SERS 基板的结构及在本工作中的应用示意图。(b) SERS 底物 AgNPs−CdSNWs/ 纳米膜的制备。

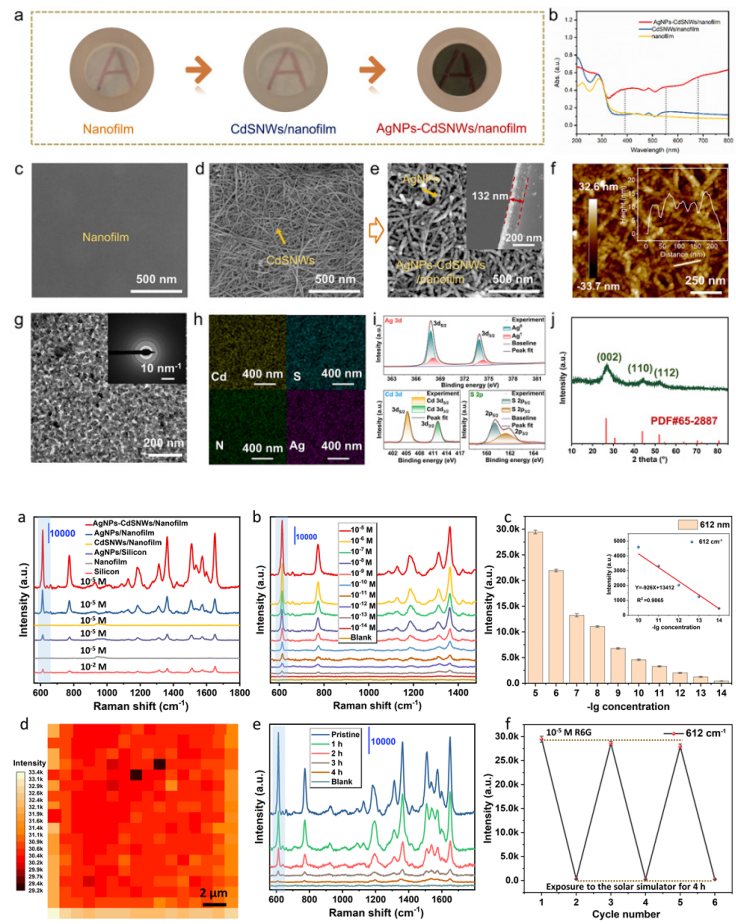
Figure 1. (a) Schematic illustration of the structure and application of SERS substrate in this work. (b) The preparation of the SERS substrate, AgNPs-CdSNWs/nanofilm.

图 2. (a) 纳米膜、CdSNWs/ 纳米膜和 AgNPs−CdSNWs/ 纳米膜的光学照片，(b) 紫外可见光谱和 (c−e) 扫描电镜图像。(f) AgNPs−CdSNWs/ 纳米膜的 AFM 图像，(g) HR−TEM 图像和相应的电子衍射图，(h) EDS 元素映射，(i) XPS 光谱。(j) CdSNWs/ 纳米膜的 PXRD 谱图。

Figure 2. (a) Optical photographs, (b) UV-vis spectra and (c-e) SEM images of the nanofilm, CdS NWs/nanofilm, and AgNPs-CdSNWs/nanofilm. (f) AFM images, (g) HR-TEM images and corresponding electron diffraction pattern, (h) EDS elemental mappings, (i) XPS spectra of AgNPs-CdSNWs/nanofilm. (j) The PXRD pattern of CdSNWs/ nanofilm.

图 3. (a) 532 nm激发激光下 R6G 在硅、AgNPs − 硅、纳米膜、AgNPs − 纳米膜、CdSNWs/ 纳米膜和 AgNPs−CdSNWs/ 纳米膜上的拉曼光谱。(b) 基线减法后，不同 R6G 浓度下激发波长 532 nm 下 SERS 底物上 R6G 分子的拉曼光谱。(c) 不同 R6G 浓度下 612 cm^{-1} 处拉曼峰强度，标准差为误差条。(d) R6G 在 612 cm^{-1} 处信号强度的 SERS 映射。(e) 10^{-5} M R6G 不同时间光照射后的拉曼光谱。(f) 光照射后滴入 10^{-5} M R6G 3 次，SERS 底物的再现性测试。

Figure 3. (a) Raman spectra of R6G, respectively, on silicon, AgNPs-silicon, nanofilm, AgNPs-nanofilm, CdSNWs/ nanofilm and AgNPs-CdSNWs/nanofilm under the excitation laser of 532 nm. (b) Raman spectra of R6G molecules on the SERS substrate obtained at different R6G concentrations at an excitation wavelength 532 nm after baseline subtraction. (c) Intensities of the Raman peaks at 612 cm^{-1} at different R6G concentrations, with standard deviations as error bars. (d) SERS mappings of the signal intensity at 612 cm^{-1} for R6G. (e) Raman spectra of 10^{-5} M R6G after light irradiation at different times. (f) Reproducibility test for the SERS substrate upon 3 cycles of dropping 10^{-5} M R6G after light irradiation.



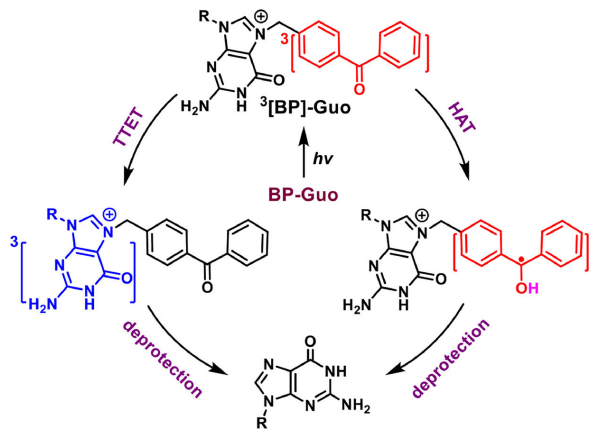
Chinese Chemical Letters
Available online 8 May 2024, 109971
In Press, Journal Pre-proof ? What's this?

Photochemical reaction mechanism of benzophenone protected guanosine at N7 position

Yan Guo [a], Hongtao Bian [a], Le Yu [b], Jiani Ma [a], Yu Fang [a]

基于二苯甲酮 PPG 保护鸟苷 N7 位化合物的光化学反应机理

Yan Guo, Hongtao Bian, Le Yu, Jiani Ma*, and Yu Fang. Chin. Chem. Lett., 2024, 109971. DOI: 10.1016/j.cclet.2024.109971.



建立与自然系统相媲美的生物功能可控性是阐明细胞内生物分子动态过程和机制的重要工具。利用光敏保护基团（PPG）可实现对生物分子的精确时空控制，其核心思想是将小分子、蛋白质和核酸等通过化学键合在光敏分子单元，使用时经适当波长的光照可释放出被保护的生物分子，从而恢复其生物功能和活性。不同于传统的通过在 PPG 上修饰氢原子而不改变电荷分布的碱基保护方法，Rentmeister 等通过在碱基上引入正电荷以保护核酸。该策略可扩展至保护更复杂的生物分子（如二核苷酸和 RNA 等），从而实现生物学相关功能的时间和空间控制。为了提高光脱保护反应效率并提供高性能 PPG 的设计原则，我们选择二苯甲酮为 PPG 对鸟苷 N7 位保护的化合物（记为 BP–Guo）作为模型分子（图 1），研究这类 PPG 的光保护反应机制。

本文基于飞秒瞬态吸收、纳秒瞬态吸收和纳秒共振拉曼实验光谱以及密度泛函理论计算的结果分析，提出了 BP–Guo 的光脱保护机制（如图 2 所示）。BP–Guo 受光激发至单重态后发生 ISC 生成 3[BP]–Guo，其通过两种路径进行光脱保护反应。一条途径是：发生分子内三线态 – 三线态能量转移（TTET）生成 BP–3[Guo]，其 C–N 键断裂释放 Guo 和 BP 阳离子，后者被溶剂捕获得到最终产物；另一种反应路径为 3[BP]–Guo 与溶剂丙三醇发生分子间 HAT 生成 ketyl–Guo，其发生裂解反应释放出 Guo 和 BP 自由基阳离子。BP 自由基阳离子发生电子转移，并进一步异构化为 4– 甲基 BP。本机制研究表明：BP 经历 TTET 途径虽然可进行后续的光脱保护反应，还会诱

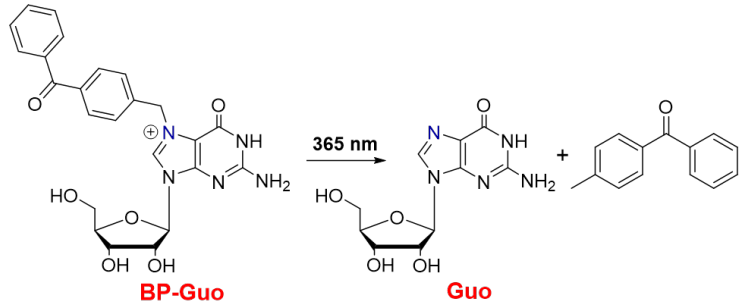


图 1. BP−Guo 的光脱保护反应
Figure 1.Photorelease reaction of Guo from BP-Guo

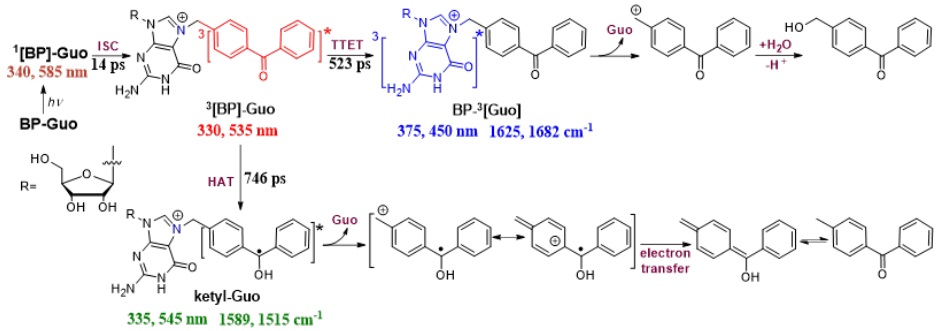


图 2. 化合物 BP−Guo 在丙三醇 − 乙腈 − 水中的光脱保护反应机理
Figure 2.Proposed photodeprotection mechanisms of BP-Guo in glycerol-ACN-H_2O

发生成三重态核酸，引发环化反应，从而产生 DNA 诱变加合物，造成三重态光损伤。因此在设计、开发改进的光保护核酸策略时应避免该反应通道的进行。

第一作者：陕西师范大学博士后郭燕
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全文链接：https://www.sciencedirect.com/science/article/pii/S100184172400490X

Establishing the precise conditional control of biological function comparable to that of the natural system is an important tool for elucidating the mechanisms of cellular processes. One of the most excellent strategies is photoregulation by introducing photolabile protecting group (PPG) to small molecules, proteins, and nucleic acids. After light irradiation at a suitable wavelength, the protecting group is irreversibly cleaved whereby the masked native functionality and biological activity of the protected compound can be restored. Unlike the typical protecting strategies of nucleobases, in which PPG replaces a hydrogen atom with modifications and does not change the charge distribution of the molecule, Rentmeister developed a novel strategy to protect nucleic acids by introducing a positive charge on nucleobase. And this strategy is extended to more complex biomolecules dinucleotide and RNA, achieving to spatiotemporally control biologically relevant functions. In order to improve the efficiency of photodeprotection reaction and to provide design principles for high-performance PPGs, Benzophenone protected guanosine at N7 position (denoted as BP-Guo) was selected as the representative system to study the photodeprotect mechanism (Figure 1).

The femtosecond transient absorption, nanosecond transient absorption, and nanosecond transient resonance Raman spectroscopy coupling with density functional theory were employed to thoroughly investigate the photorelease mechanism. The photodeprotection mechanism of BP-Guo is depicted (Figure 2). After generation of 3[BP]-Guo, two competing reaction routes occurred to trigger the photodeprotection. One route is the TTET to yield BP-3[Guo], which breaks C-N bond to release the Guo along with BP cation that finally trapped by solvent to give the final product. The other is the HAT with formation of ketyl-Guo, followed by releasing Guo and the BP radical cation. The later undergoes electron transfer and further tautomerizes to 4-methylBP. The present results provide an in-depth insight into the inactivation pathway for BP protected nucleic acids after light irradiation. In particular, the photosensitized TTET pathway from BP leads to the generation of nucleic acid in their triplet states, which, in addition to potentially initiating photodeprotection, may also trigger well-known cyclization reactions that brings about DNA mutagenic adducts, commonly referred to as triple photodamage. The latter needs further investigation and should be avoided in developing improved strategies for photoprotecting nucleic acids.

First Author: Dr. Guo Yan, Shaanxi Normal University
Correspondence Author: Prof. Ma Jiani, Shaanxi Normal University
Full Text Link: https://www.sciencedirect.com/science/article/pii/S100184172400490X

ACS APPLIED NANO MATERIALS

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Silica Nanoparticle-Based FRET System for Hydrogen Sulfide Detection in Biological and Food Samples

Kaixiang Cui, Min Qiao, Wan Xu, Zhen Yan, Haonan Peng,* Liping Ding,* and Yu Fang

Cite This: https://doi.org/10.1021/acsanm.4c01342 Read Online

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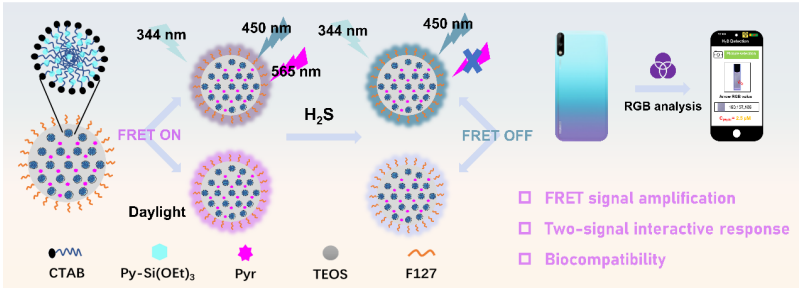
SiO_2 纳米颗粒基 FRET 系统用于生物和食品样品硫化氢检测

Kaixiang Cui, Min Qiao, Wan Xu, Zhen Yan, Haonan Peng*, Liping Ding*, and Yu Fang. ACS Appl. Nano Mater., 2024, 7, 11739-11748.



硫化氢 (H_2S) 是一种重要的内源性信号分子，其在生物医学和食品安全领域发挥着举足轻重的作用。在生物和食品样品中实现对 H_2S 可视化、便携和灵敏检测对疾病早期诊断和食品质量把控具有重要意义。然而，疾病早期和食物变质时，H_2S 浓度较低，加之检测样品的固有复杂性、干扰因素多，给 H_2S 精确定量检测带来巨大挑战。比例型荧光传感通过测量两个不同波长荧光发射的强度比，可以有效克服对分析物的检测干扰，提高检测精度和实用性，且同时具有检测灵敏度高、可视化效果好等优点。然而，基于传统有机小分子制备比例荧光传感器通常需要复杂的合成过程，而且生物相容性差，限制其在某些特殊场景下的使用。

基于以上认识，本工作利用 SiO_2 纳米粒子易于功能化、生物相容性好的优势，采用一步共缩合的制备方法，将具有 Förster 共振能量转移（FRET）效应的芘和吡罗红共同修饰于 SiO_2 纳米粒子，设计制备了一种可对 H_2S 比例型响应的荧光纳米传感器（Pyr@Py–SiO_2 NPs）。实验结果表明 Pyr@Py–SiO_2 NPS 中苯并吡喃单元可以与 H_2S 发生亲核加成反应，中断了纳米传感器中从芘到吡罗红的 FRET 过程，导致吡罗红在 565 nm 处的荧光发射显著降低。Pyr@Py–SiO_2 NPS 对 H_2S 具有显著的比例型响应特点，且展现了高选择性、高灵敏度（LOD=71.5 nM）和快速响应（≤ 10 s）。

在智能手机辅助下，基于比色法和比例荧光检测的双模式响应，Pyr@Py–SiO_2 NPS 可实现对 10% 人体尿液中 H_2S 的定量便携式检测，通过建立的校准曲线和标准比色卡，可方便、直观地检测生物尿液中的 H_2S。Pyr@Py–SiO_2 NPs 还表现了在洋葱内表皮组织细胞中对内源性 H_2S 成像的应用潜力。此外，将 Pyr@Py–SiO_2 NPs 制备成试纸条薄膜传感器，可用于食物变质过程中标志性气体 H2S 的检测，呈现较好的可视化检测应用效果。总之，新设计制备的荧光纳米传感器 Pyr@Py–SiO_2 NPs 为生物系统中 H_2S 传感和食品安全监测提供了一种有效的工具，具有较好的实际应用潜力。

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Hydrogen sulfide (H_2S) is an important endogenous signaling molecule that plays a pivotal role in biomedical and food safety fields. Visualisation, portability and sensitive detection of H_2S in biological and food samples are

important for early diagnosis of certain diseases and ensuring food quality. In the field of H_2S detection, the accuracy and validity of current methods face significant challenges, especially due to the low concentration of H_2S in early stage diseases and food spoilage, the inherent complexity of the test samples, and the high number of interfering factors that pose a great obstacle to the accurate quantitative detection of H_2S. The use of proportional fluorescent sensors for analyte detection can effectively overcome interferences and improve detection accuracy and practicality. By measuring the intensity ratio of fluorescence emission peaks at two different wavelengths, it has the advantages of high detection sensitivity, good visualisation and strong anti-interference ability. However, the preparation of proportional fluorescence sensors based on traditional organic small molecules usually requires a complex synthesis process, and poor biocompatibility and water solubility limit their use in some special scenarios.

Based on the above understanding, in this work, a H_2S proportional fluorescent nanosensor (Pyr@Py-SiO_2 NPS) based on the Förster resonance energy transfer (FRET) effect was designed and prepared by using a one-step co-condensation preparation method taking advantage of the ease of functionalization modification, good biocompatibility of SiO_2 nanoparticles. The experimental results showed that the benzopyrylium unit in the Pyr@Py-SiO_2 NPS could undergo a nucleophilic addition reaction with H_2S, which interrupted the FRET process from pyrene to the pyronine unit in the nanosensor, leading to a significant decrease in the fluorescence emission of the pyronine unit at 565 nm. Therefore, the Pyr@Py-SiO_2 NPS was characterized by a significant proportional type response to H2S with high selectivity, high sensitivity (LOD = 71.5 nM) and fast response (≤10 s). Based on the dual-wavelength emission of FRET effect, the response of Pyr@Py-SiO_2 NPS to H_2S was characterized by a significant colour change under both daylight and fluorescence, which is expected to enable portable and visual detection of H_2S.

Pyr@Py-SiO_2 NPs enables quantitative portable detection of H2S in 10% human urine based on a dual-mode response of colorimetric and proportional fluorescence detection with the assistance of a smartphone. A calibration curve and a standard colorimetric card were established for more convenient and intuitive detection of H_2S in biological urine solutions. Pyr@Py-SiO_2 NPs also showed great application potential for imaging endogenous H_2S in onion endo-epidermal tissue cells. In addition, Pyr@Py-SiO_2 NPs were loaded into test strip films for visual detection of the signal gas H_2S during food spoilage. In conclusion, the newly designed and prepared fluorescent nanosensors, Pyr@Py-SiO_2 NPs, provide an effective tool for H_2S sensing in biological systems and food safety monitoring, with a large potential for practical applications.

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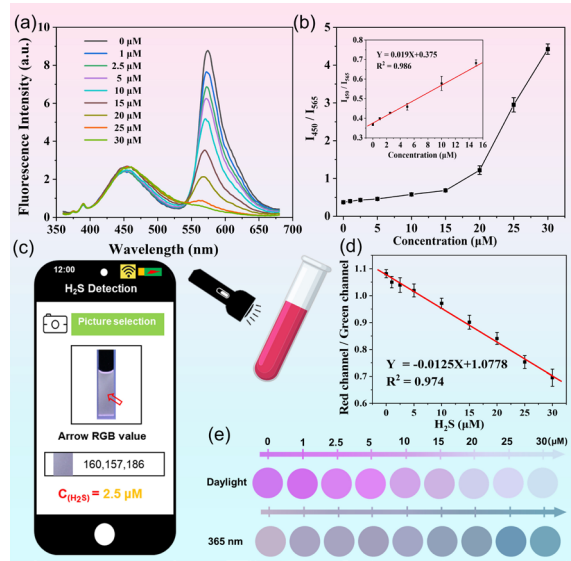

图 1. Pyr@Py−SiO_2 NPs 检测尿液中 H_2S 的性能评价 :(a) 人尿中 H_2S 滴定后的荧光光谱；(b) I450/I565 随 H_2S 浓度的变化图 (附图 :I_{450}/I_{565} 与 H_2S 浓度在 0−15 μM 范围内的线性关系)；(c) 基于智能手机的 H_2S 检测系统示意图；(d) 不同 H_2S 浓度下传感器溶液的读通道 / 绿通道比值线性图；(e) 标准比色卡，显示不同 H_2S 浓度下的颜色变化，由智能手机传感器平台监测。误差条表示三个独立测量的标准差。

Figure 1.Performance evaluation of Pyr@Py-SiO_2 NPs in H2S detection in human urine: (a) Fluorescence spectra upon titration of H_2S in human urine; (b) Plot of I450/I565 as a function of H_2S concentration (Inset: the linear relationship between I_{450}/I_{565} and H_2S concentration ranging from 0 to 15 μM); (c) Schematic illustration of a smartphone-based H2S detection system; (d) The linear plot of read channel/green channel ratio of the sensor solution corresponding to different H_2S concentrations; (e) Standard colorimetric card displaying color changes at various H_2S concentrations, as monitored by a smartphone sensor platform. Error bars represent the standard deviation of three independent measurements.

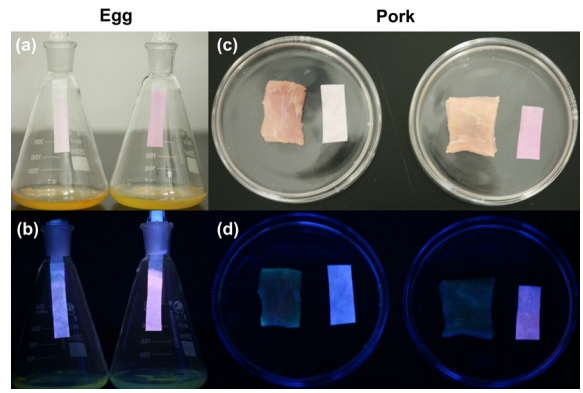

图 2.Pyr@Py−SiO2 NPs 试纸条在食品腐败中检测 H2S 的应用。

Figure 2. Application of Pyr@Py-SiO2 NPs test strips for H2S detection in food spoilage.

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Aminonaphthalene and aminoquinoline photocages: *meta*-effect and photo-release of carboxylic acids and alcohols

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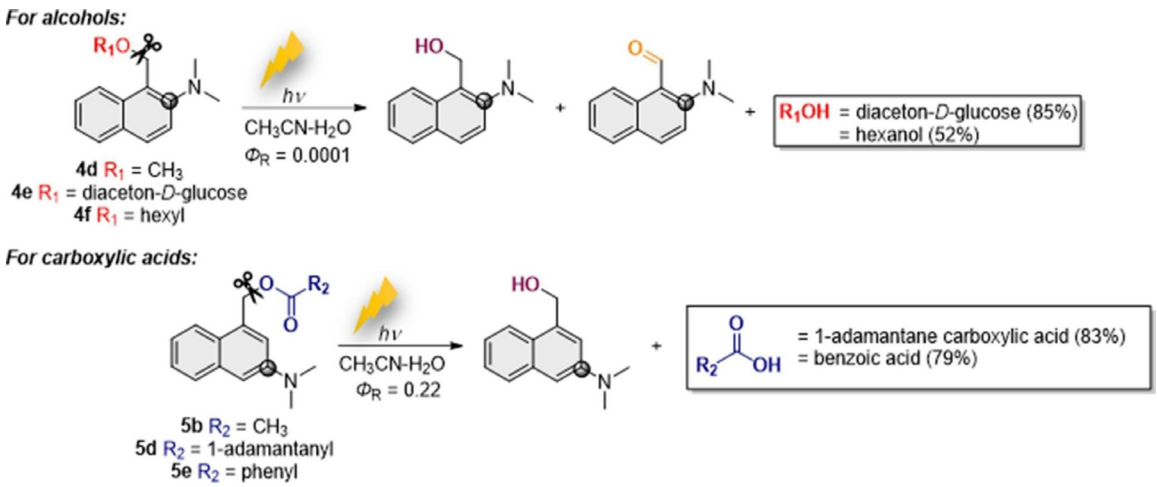
氨基萘衍生物光敏保护基的反应机理研究

Vilma Lovrinčević, Dexin Zheng, Mélyne Baudin-Marie, Mia Marić, Lidija Uzelac, Irena Škorić, Jiani Ma*, and Dragana Vuk*. J. Photochem. Photobiol. A Chem., 2024, 454, 115715.



光敏保护基可以掩蔽被保护基团的化学和生物活性，通过选取适当波长的光进行照射，可以精确释放出目标分子，使其性能恢复。Wang 等开发了基于meta–effect的特定光敏保护基，他们证明了间羟甲基苯胺光敏保护基在醇中的应用。此外，研究表明，邻羟甲基苯胺衍生物也可以用作光敏保护基释放醇和羧酸，这些邻苯胺衍生物通过引入甲基反应中心从而改变其对酸或醇的释放。然而，由于苯胺光敏保护基的光吸收位于紫外区，这降低了它们在生物系统中的适用性。为了解决该问题，我们设计开发了系列N, N– 二甲基萘光敏保护基，其吸收位于可见光区域，且可高效地光化学释放羧酸盐。以 5b 作为模型分子（图 1），研究了该类 PPG 的光保护反应机制。

本文基于飞秒瞬态吸收、纳秒瞬态吸收以及密度泛函理论计算的结果分析，提出了 5b 的光脱保护机制（如图 2 所示）。结果表明，5b 受光激发后跃迁至单重激发态 S_1，随后均裂生成自由基对，最后发生电子转移生成碳正离子并释放羧酸。

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全文链接：https://www.sciencedirect.com/science/article/pii/S1010603024002594

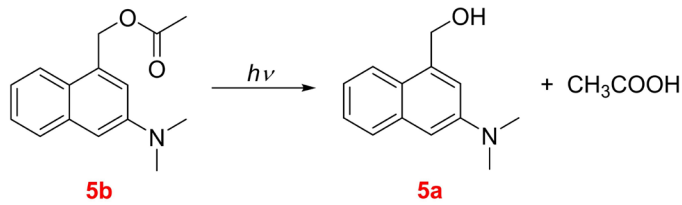

图 1. 5b 的光脱保护反应

Figure 1. Photorelease reaction of 5b

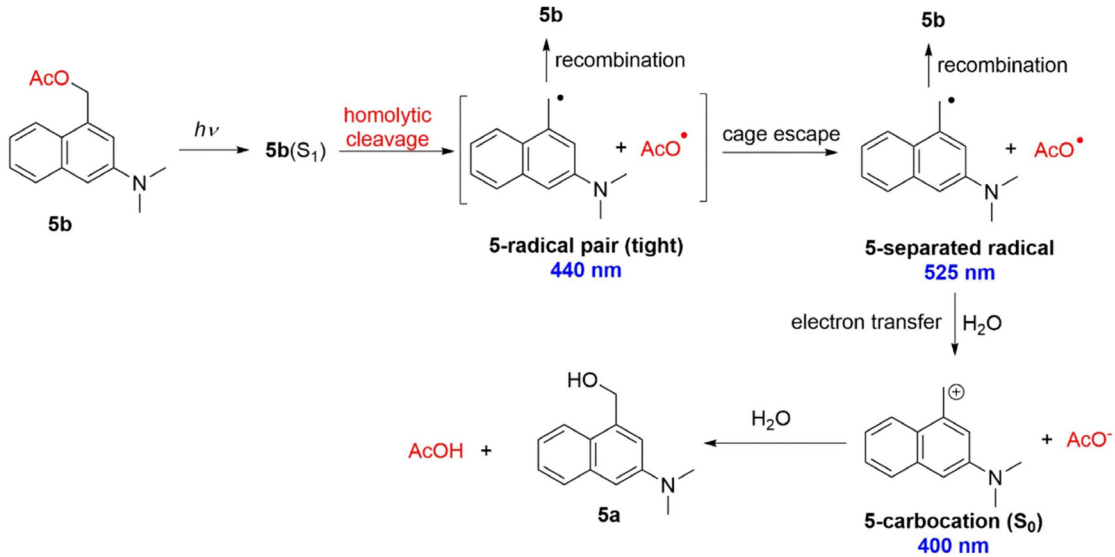

图 2. 化合物 5b 的光脱保护反应机理

Figure 2. Proposed photodeprotection mechanisms of 5b

The photolabile protective group (PPG) can mask the chemical and biological activity of the protected group. By selecting the appropriate wavelength of light for irradiation, the target molecule can be accurately released and its performance can be restored. Wang et al. developed a specific line of photocages that base their photoreactivity on the Zimmerman's meta-effect, and they demonstrated the use of m-hydroxymethylaniline photocages for alcohols. Furthermore, Wang et al. and we have shown that o-hydroxymethylaniline derivatives can also be used as photocages for alcohols and carboxylic acids. The photoreactivity of these o-aniline derivatives can be modified towards the release of acids or alcohols by introducing a methyl group in the reactive center. However, aniline photocages absorb light at $\lambda < 350$ nm, which reduces their applicability in biological systems. To address this problem we extended the chromophoric system and developed N,N-dimetyhlaminonaphthalene photocages, which absorb at near-visible region and can be used together with anilines for chromo-orthogonal deprotection. Further investigation led to the development of substituted aminonaphthalenes, which react more efficiently in releasing carboxylates. For this reason, 1,3-substituted N,N-dimetyhlaminonaphthalene photoprotective groups (denoted as 5b) were selected as the representative system to study the photodeprotect mechanism (Scheme 1).

The femtosecond transient absorption and nanosecond transient absorption coupling with density functional theory were employed to thoroughly investigate the photorelease mechanism. The photodeprotection mechanism of 5b is depicted (Scheme 2). The results show that the photoelimination of carboxylates takes place directly in the singlet excited state by a homolytic cleavage producing a radical pair. The subsequent electron transfer gives rise to aminonaphthalene carbocation and the carboxylate.

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Full Text Link: https://www.sciencedirect.com/science/article/pii/S1010603024002594

英国女王大学 Amilra Prasanna de Silva 教授应邀作报告

Prof. Amilra Prasanna de Silva invited to give a report

2024 年 5 月 6 日上午，英国皇家科学院院士、英国北爱尔兰女王大学 Amirla Prasanna de Silva 教授应邀访问新概念传感器与分子材料研究院，并作了题为 A Tool, an App and a Field: Products of Supramolecular Photoscience from Northern Ireland and Sri Lanka 的学术报告。

AP de Silva 教授首先介绍了其近 40 年间的研究工作，重点介绍了其在斯里兰卡完成和推广的 PET 设计，并详细讲述了选择性检测钠离子的 Off–On 传感器相关内容，最后分享了分子逻辑计算相关知识，通过动物视觉和机器视觉讲述了分子逻辑边缘检测，强调了分子逻辑计算的重要性。

本次报告会由丁立平教授主持，研究院和化学化工学院物理化学专业教师及研究生参加了此次报告会，并与 AP de Silva 院士进行了问答交流。

On May 6, 2024, Prof. Amirla Prasanna de Silva, Fellow of the Royal Academy of Sciences, Queen's University of Northern Ireland, U.K. was invited to visit the Institute of New Concept Sensors and Molecular Materials, and presented a report titled "A Tool, an App and a Field: Products of Supramolecular Photoscience from Northern Ireland and Sri Lanka".

Prof. AP de Silva first introduced his nearly 40 years of research work, with a focus on the PET design he completed in Sri Lanka, and detailed the Off-On sensor for selective detection of sodium ions, and shared the knowledge of molecular logic calculation, explaining molecular logic edge detection through animal vision and machine vision, and stressing the importance of molecular logic computation.

Teachers and graduate students from the major of Physical Chemistry of the Institute and the School of Chemistry and Chemical Engineering attended in the report, which was chaired by Prof. Ding Liping, and they exchanged ideas with Prof. AP de Silva.

华中科技大学蓝新正教授应邀作报告

Prof. Lan Xinzheng of Huazhong University of Science and Technology invited to give a report

2024 年 5 月 7 日，华中科技大学蓝新正教授应邀访问新概念传感器与分子材料研究院并在报告厅作题为“红外胶体量子点材料与光探测技术”的报告。报告会由边红涛教授主持，房喻院士和研究院部分教师及研究生参加。

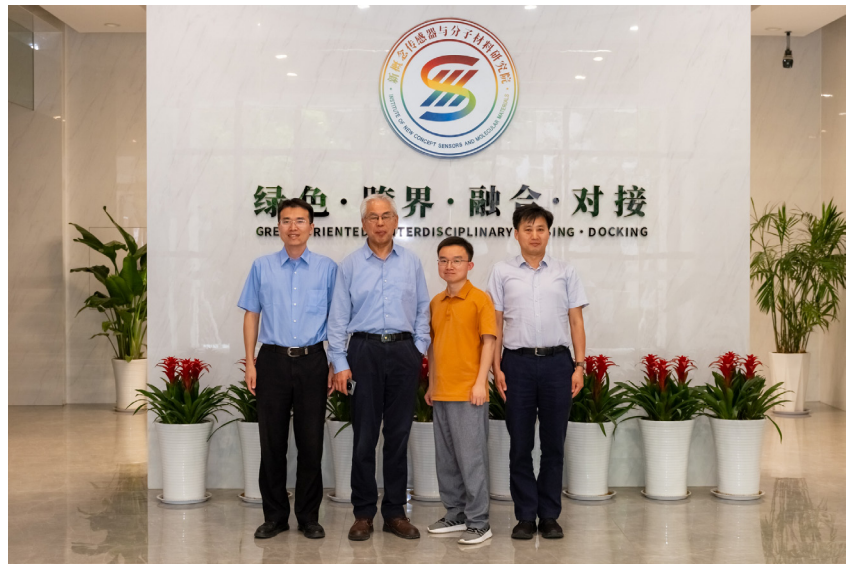
蓝新正教授的主要研究领域是新型半导体材料与光电器件，近年来围绕新型半导体的物性调控及其高性能光伏、光电探测器件的制备等，开展了系统而深入的研究。蓝教授首先介绍了胶体量子点红外探测器的研究进展，在此基础上介绍了围绕半导体级量子点材料及高性能探测器件所开展的研究工作，主要涉及量子点材料的缺陷钝化、能级和掺杂调控以及迁移率的改进，并展望了量子点红外探测技术的发展。

报告结束后，蓝新正教授与在场师生就相关问题进行了交流并合影留念。

On May 7, 2024, Prof. Lan Xinzheng from Huazhong University of Science and Technology (HUST) was invited to visit the Institute of New Concept Sensors and Molecular Materials and present a report titled “Infrared Colloidal Quantum Dot Materials and Light Detection Technology” in the INCSMM lecture hall. The report was hosted by Prof. Bian Hongtao and attended by Prof. Fang Yu, INCSMM faculty members and graduate students.

Prof. Lan’s main research field is new semiconductor materials and optoelectronic devices, and in recent years, he has carried out systematic and in-depth research on the physical properties regulation of new semiconductors and the preparation of high-performance photovoltaic and optoelectronic detector devices. Prof. Lan firstly introduced the research progress of colloidal quantum dot infrared detectors, the research work on semiconductor-grade quantum dot materials and high-performance detector devices, which mainly involves the defect passivation of quantum dot materials, the energy level and doping modulation, and the improvement of migration rate, and he also made an outlook on the development of quantum dot infrared detection technology.

After the report, Prof. Lan exchanged views with teachers and students present on related issues and took a group photo with Prof. Fang and Prof. Bian.



德国乌尔姆大学 Max von Delius 教授应邀作报告

Prof. Max von Delius of of UIm University invited to give a report

2024 年 5 月 18 日下午，德国乌尔姆大学 Max von Delius 教授应邀访问新概念传感器与分子材料研究院，并作题为 Supramolecular Control: Strategic Uses of Carbon Nanohoops, Fluorinated Cyclohexanes and Organophosphates 的学术报告。

Max von Delius 教授介绍了他们小组利用超分子化学来解决合成、材料科学和系统化学等方面的挑战方面的工作。首先，介绍了其通过包封 C 在一个三壳配合物来控制氟烯二加成反应的选择性。接着向大家介绍了控制自组装的应用。最后介绍了这种自组装在化学燃料的酰胺磷酸和酰基磷酸体系中实现了对超分子组装随时间的持久性控制。

本次报告会由丁立平教授主持，研究院和化学化工学院物理化学专业教师及研究生参加了此次报告会，并与 Max von Delius 教授进行了问答交流。

On May 18, 2024, Prof. Max von Delius of UIm University visited the Institute of New Concept Sensors and Molecular Materials and gave a report titled “Supramolecular Control: Strategic Uses of Carbon Nanohoops, Fluorinated Cyclohexanes and Organophosphates”.

Prof. Delius presented his group’s work in using supramolecular chemistry to address challenges in synthesis, materials science and systemic chemistry. He first introduced the selectivity to control the fluorene diaddition reaction by enclosing C in a three-shell complex (“Russian Doll”), and then the application of control self-assembly. Finally, he explained that this self-assembly enables persistent control of supramolecular assembly over time in the amide phosphate and acyl phosphate systems of chemical fuels.

Teachers and graduate students of the major of Physical Chemistry of the Institute and the School of Chemistry and Chemical Engineering attended in the report, which was chaired by Prof. Ding Liping, and exchanged ideas with Prof. Delius.

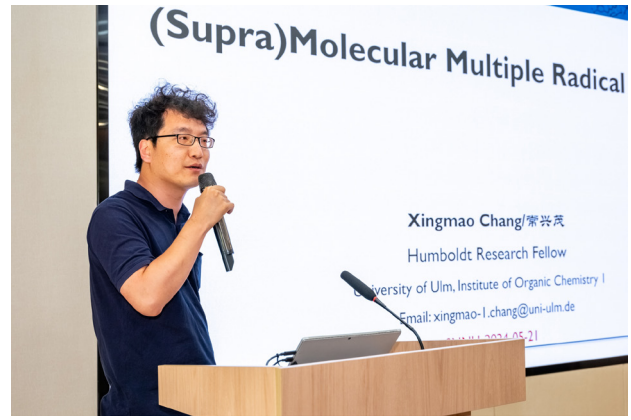
常兴茂博士应邀作报告

Dr. Chang Xingmao invited to give a report

2024 年 5 月 21 日下午，光子鼻与分子材料团队 2019 届博士毕业生、洪堡学者常兴茂博士应邀为新概念传感器与分子材料研究院师生开展了题为 (Supra) Molecular Multiple Radical Systems 的学术报告。

常兴茂首先介绍了其在博士后期间的主要工作，讲解了分子多自由基系统和分子量子比特的重要性，从具有稳定红外发射的双自由基体系的构建，到多自旋体系中蒽与铜卟啉相互作用的研究，告诉大家实现可控的双自旋相互作用需要在精准的有机合成和超分子中取得进步。最后，常兴茂分享了在德国的学习研究经验，以及在国内高校和论坛的交流心得，通过自身求学经历鼓励大家坚持科研。

本次报告会由黄蓉蓉博士主持，研究院和团队全体师生参加了此次报告会，与常兴茂博士进行了讨论交流，并合影留念。



On May 21, 2024, Humboldt scholar Dr. Chang Xingmao, a 2019 PhD graduate of the Photonic Nose and Molecular Materials Group, was invited to give a report titled “(Supra) Molecular Multiple Radical Systems” for teachers and students of the Institute of New Concept Sensors and Molecular Materials.

Dr. Chang Xingmao first introduced his main work during his post-doctoral program, explained the molecular multi-radical system and the importance of molecular quantum bits, and told the audience that the progress of accurate organic synthesis and supramolecules is required to achieve controlled two-spin interactions, from the construction of biradical systems with stable infrared emission to the study of the interaction between anthracene and copper porphyrin in multi-spin systems. Finally, Chang Xingmao shared his learning and research experience in Germany, reflected on the exchange of ideas in Chinese universities and forums, and encouraged students in the audience to persist in research through his own learning experience.

The report was chaired by Dr. Huang Rongrong. Teachers and students of the Institute and the Group attended the report and exchanged ideas with Dr. Chang.

马佳妮教授参加第二届光谱技术与应用大会并作报告

Ma Janni presents at Second Conference on Spectroscopy Technology and Application

2024 年 5 月 11 日，新概念传感器与分子材料研究院马佳妮教授参加了“第二届光谱技术与应用大会”，并作了题为“光笼分子反应机制的时间分辨光谱研究”的学术报告。

本次会议于 5 月 9 日至 11 日由中国光学工程学会在大连举办，100 余位光谱领域专家与会，通过学术报告、海报展示、对接洽谈等形式就重要科学问题、核心元器件关键技术问题和工程应用最新成果展开交流。

On May 11, 2024, Prof. Ma Janni of the Institute of New Concept Sensors and Molecular Materials participated in the “Second Conference on Spectroscopy Technology and Application” and presented a report titled “Time-resolved Spectroscopy on the Response Mechanisms of Photocaged Molecules”.

The conference was organized by the Chinese Society of Optical Engineering in Dalian from May 9 to 11, and attended by more than 100 experts in the field of spectroscopy, who exchanged views on the important scientific issues, key technological issues of core components and the latest achievements in engineering applications through academic reports, poster presentations and docking negotiations.

陕西省科学技术厅来访座谈

Shaanxi Science and Technology Department visitors received

2024 年 5 月 23 日上午，陕西省科学技术厅一级巡视员韩开兴、实验室建设与管理处副处长王莹一行到访新概念传感器与分子材料研究院，与房喻院士进行了座谈交流。陕西师范大学科学技术处处长、化学化工学院院长薛东教授、副院长丁立平教授、彭浩南教授、办公室主任杨小刚，西安交通大学刘峰教授、何刚教授参加座谈交流。

On May 23, 2024, Han Kaixing, first-level inspector of Shaanxi Province Science and Technology Department, and Wang Ying, deputy director of SPSTD Laboratory Construction and Management Office, visited the Institute of New Concept Sensors and Molecular Materials and had a discussion and exchange with Prof. Fang Yu. Prof. Xue Dong, director of the Department of Science and Technology and dean of the School of Chemistry and Chemical Engineering of Shaanxi Normal University, INCSMM vice dean Prof. Ding Liping, Prof. Peng Haonan, Administritive Office director Yang Xiaogang, and Xi’an Jiaotong University’s Prof. Liu Feng and Prof. He Gang participated in the meeting.

西安市临潼区中学师生来院进行科普参观学习

Middle School teachers and students from Lindong District middle schools received for science popularization tour

2024 年 5 月 28 日上午，来自西安市临潼区的西安市李东京名校长 + 领航研修共同体成员学校陕鼓中学、马额中学和华清中学教育集团分校铁路中学、雨金中学及华清中学的近 50 名师生前来新概念传感器与分子材料研究院进行科普参观学习，感受科技魅力，感悟科学风采。

副院长丁立平教授向同学们介绍了研究院基本情况、科研团队、科研概况和发展理念，带领他们参观了研究院成果展厅、实验室和研究生学习室，讲解了房喻院士团队研发的爆炸物探测仪、毒品探测仪等科研成果转化产品。

房喻院士深情寄语家乡学子：“故乡是让人魂牵梦绕的地方，同学们要努力学习，热爱家乡，建设家乡；祖国是我们坚强的后盾，同学要把握好高中关键时段，打好基础，努力攀登科学高峰，摆脱在高科技领域受制于人的局面，为国家富强、民族振兴贡献自己的力量。”

华清中学校长李东京勉励参加活动的同学“矢志成为像房喻院士一样的科学家，努力为中国式现代化挺膺担当，把青春热血镌刻在中国科创历史的丰碑之上。”

华清中学教师苏环表示：“参观了房喻院士的实验室让我备受鼓舞，我和我的同事将大力弘扬科学家精神，努力培养具有优秀科学素养的高中生，在促进高水平科技自立自强工作中做出基础教育人的积极贡献”。

西安市科学技术协会党组书记耿占军，临潼区科学技术协会主席牛志峰，副主席文萍，临潼区教育局党委委员赵小县，陕西师范大学科学技术处薛东处长、屈新运副处长等参加活动。

参观研究院之前，华清中学教育集团师生还参观了陕西师范大学教育博物馆和化学化工学院大型科学仪器共享平台。

On May 28, 2024, about 50 teachers and students from Shaangu Middle School and Ma’e Middle School of the Xi’an Li Dongjing Famous Principal + Pilot Research and Training Community, and member schools Railway Middle School and Yujin Middle School of Huaqing Middle School Education Group,

and Huaqing Middle School in Lintong District, Xi'an City came to the Institute of New Concept Sensors and Molecular Materials for a science popularization visit, to feel the charm and elegance of science and technology.

INCSMM vice dean Prof. Ding Liping briefed the students about the basic situation of the Institute, the research team, development concept, and led them to visit the Institute's achievement exhibition room, laboratories and postgraduate study room, explaining the explosives detector, illicit drug detector and other commercialized products developed from research results of Prof. Fang Yu's team.

Fang Yu said affectionately to students from his hometown, "Hometown is a place that makes one's soul lingering; you as students should study hard, love your hometown, and build their hometown. The motherland is our strong support; yoou should grasp the key period of high school, lay a good foundation, and strive to climb the peak of science, get rid of the constraints in the high-tech field, and contribute to the prosperity of the country and the rejuvenation of the nation."

Huaqing High School Principal Li Dongjing encouraged the students to "aspire to become scientists like academician Fanyu, and strive to bear responsibility for the Chinese modernization, and engrave their names on the monument of the history of China's science and innovation."

Huaqing High School teacher Su Huan said, "Visiting the laboratory of academician Fang Yu encouraged my colleagues and me, and I will vigorously carry forward the spirit of scientists, and endeavour to cultivate high school students with excellent scientific literacy, and make a positive contribution to the work of basic education to promote high-level scientific and technological self-reliance and self-improvement."

Geng Zhanjun, secretary of the Party Group of Xi'an Association of Science and Technology, Niu Zhifeng, chairman of Lintong District Association of Science and Technology, Wen Ping, vice chairman of the Association, and Zhao Xiaoxian, member of the Party Committee of Lintong District Education Bureau, and Shaanxi Normal University Science and Technology Department director Xue Dong, deputy director Qu Xinyun participated in the event.

Before visiting the Institute, teachers and students of Huaqing Middle School Education Group also visited the Education Museum of Shaanxi Normal University and the Large Scientific Instrument Sharing Platform of School of Chemistry and Chemical Engineering.

西安凯立新材料公司一行来访

Xi'an Kaili Catalyst and New Materials visitors received

2024 年 5 月 31 日，西安凯立新材料股份有限公司党委书记兼董事长张之翔一行到访新概念传感器与分子材料研究院，参观了综合展厅，并与房喻院士进行了座谈交流。

陪同来访的有凯立新材副总经理李岳锋、副总工程师高武和铜川凯立（凯立新材全资子公司）总经理曾利辉。研究院办公室主任杨小刚和专职科研人员王佩参加了座谈交流。

On May 31, 2024, Party Secretary and board chairman Zhang Zhixiang of Xi'an Kaili Catalyst and New Materials Co., Ltd. and his associates visited the Institute of New Concept Sensors and Molecular Materials, and had a talk with Prof. Fang Yu after visiting the the comprehensive exhibition room.

Accompanying Zhang Zhixiang were Kaili deputy general manager Li Yuefeng, deputy chief engineer Gao Wu and Tongchuan Kaili (Kaili's wholly-owned subsidiary) general manager Zeng Lihui. INCSMM Administrative Office director Yang Xiaogang and research assistant Ms Wang Pei participated in the talk.

抉择人生：跟着感觉走

Making Life Choices: Follow Your Instinct

文 / 房喻 by Fang Yu

题记：作为智慧生物，人在成年之后，几乎每天都面临抉择。如何在关键时期做出明智的抉择，对个人、对家庭意义都十分重大。一个民族、一个国家，乃至整个世界都是个体的集合，每个人潜力的最大释放是社会最大发展的基础，因此，个人的抉择实际上也关乎到社会的发展和进步。基于这些考虑，我想用几段文字回顾个人在人生几个重要节点所做出的抉择和进行抉择的态度，以期为后来者提供一些借鉴。

十年前，我以我想上大学、我只想读书，以及我的学业导师为主要内容写了《断想钩沉—我的大学》一文，不觉中，我已从年届花甲到了年届古稀。回顾自己在人生几个关键时期做出过的几个抉择和进行抉择时的态度，对于后来者可能会有点借鉴意义，对我的女儿、我的外孙女也会留下一点记忆。

参加高考

我始于 1963 年 9 月的小学教育和直到 1971 年 7 月的初中教育均在一所“戴帽学校”（指在原来建制不变情况下增设高一级教育班级的学校，小学 + 初中），陕西省临潼县（现在的西安市临潼区）通灵寺小学完成，其后的高中教育也是在离家不足 3 公里的马额中学完成。在我的记忆中，高中学业完成之前没有离开过所在的临潼县境。好在爷爷是一位在当地很有些声望的老中医，领养的姐姐（后来因家庭成分原因返回她的父母身边）是一位初中生，他（她）们自我稍稍懂事起就教育我要好好读书。父亲、母亲虽身为农民，异常辛苦，但仍然想尽办法确保能够供养我和领养的姐姐上学，以至于让学业十分优秀，还在小学三年级的亲生姐姐辍学参加劳动。随着年龄增长，我更加能够理解父母当年的无奈，也进一步加深了我对这位只比我大两岁的姐姐的深深愧疚。

刚刚上大学时的留影（1978.02）
A photo taken when I first started college (1978.02)

小学一年级的学习美好而令人留恋。但好景不长，二年级起就开始遇上“四清”（清账目、清仓库、清财物、清工分）运动，三年级就遇上文化大革命。几年后，情况虽有所好转，但运动对正常学校教育的冲击却远远没有结束，以至于进入高中之前，我没有上过一节化学课，初中物理课也只是由一位大概只懂得些许焊接技艺，只有初中程度的民办教师讲授。实事求是地讲，他讲不明白，我们更是听不明白，一年的物理课程只能是围着焊接表演打发时间。

我的高中教育在已经提及的马额中学完成。这所学校虽然只是一所初级中学升格的高中，但较之我的初中教育，情况已经大大好转。一是教师队伍质量明显提高，二是教师职业操守完全不同。至今我依然记得很清楚，进入高中后，学校要开始讲授在现在看来简单的不能再简单的高中课程，老师们才发现这些所谓的初中毕业生知识基础是如此之差，根本无法组织正常教学。为解决这一问题，不同课程老师采取了不同的措施。负责我们的化学课程的副校长王向林老师决定拿出几个周时间，为我们集中补习初中化学知识。之后，稍显正规的高中教育才慢慢起步。不过，各种运动对教育的毒害已经深入骨髓，老师们对抓教育心有余悸，“读书无用”“知识越多越反动”“只专不红”“白专道路”思潮依然泛滥，“造反无罪、造反有理”大有市场，除个别胆子大一点的老师外，多数老师根本不敢放开手脚要求学生，组织教学。

转折发生在 1971 年的“9・13 事件”后，在周恩来总理亲自推动下，教育开始回归正轨，学校、老师们才得以理直气壮地抓教育、抓教学。与之相应，流行多年的“读书无用论”思潮也逐渐失去市场，恢复高考制度的希望初露端倪。发奋读书、通过考试改变命运成为当时众多年青人的梦想。作为那个时代的一员，我也不例外，几乎将所有的时间都用在了学习上。1973 年临潼教育部门组织全县 7 所高中的学生参加带有竞赛性质的高中数学、物理会考，我本人是全县 5 位数学满分考生之一，物理也以 93 分位列

全县第三。这些成绩的取得进一步激发了我的学习动力，增强了自信心，也为畅想大学梦奠定了基础。然而，1973 年 4 月以后，张铁生交白卷事件、小学生黄帅反潮流事件接踵而至，来之不易的教育回归正常再次遭受巨大冲击。作为农村孩子，对于通过学习改变命运的希望几乎完全湮灭。没有别的选择，高中毕业后只能返乡务农。

相对于同龄人，命运对我还算公平。一年多后，我有幸成为一所农村学校的民办教师，又回到了梦牵魂绕的学校。1977 年 7 月的一天，我突然收到已经在城市工作，我的一位儿时好友从外地发给我的一封信件，告诉我，他在出差途中得悉因文革中断的高考要重启，劝我提前开始准备。得到这个消息，我激动的心情久久不能平静。不久，这一消息就被公开。社会各界闻风而动，适龄青年积极备考。当时我的情况十分特殊，母亲病故，姐姐出嫁，父亲有病，需要照料，加之在学校干的顺风顺水，深得师生好评，有望在几年后转为公办教师。因此，亲戚、朋友、同事多在劝我，认命吧，珍惜当下，就别再参加高考了。在人生路的这个关键节点，我必须做出抉择。直到今天，我依然记得清楚，当时的抉择就是跟着感觉做出的。也就是说，不管怎样，先认真备考，因为即便参加，也未必能够考上，有幸考上，也可以不去。如果真的不参加梦寐以求的高考我一定会永生抱憾。基于这一考虑，在后来的几个月里，自己几乎倾注了所有心力，挤出了几乎所有可能的时间，在没有耽误照顾父亲，更没有耽误学校工作的前提下，走上了考场，参加了新中国恢复高考制度后的第一次高考。几个月后，喜讯传来，我被第一志愿，离家不远的陕西师范大学录取。可以想象，如果不录取，可能还要简单些，最多留些遗憾而像以往一样，继续教书，照顾家庭。这一录取，真要像考试前所开导自己的，放弃资格，不去读书，那是万万做不到的。不得已，我再次跟着感觉走，心想纵有困难万天，也要去读这个书。决定一旦做出，那是不能再改变的。感谢父亲当年对儿子不能床前日日尽孝的理解，感谢女友，我后来的夫人的鼎力支持，感谢亲朋好友的多年相助，使我圆了大学梦，也为后来能够从事自己心仪的工作奠定了基础。

出国留学

到了这个年龄，越来越能感受到老一辈共产党人的伟大。他们可以主张不同，但他们为国为民的初衷从未改变。三起三落的邓小平，恢复工作后，没有计较个人的得失，首先考虑的是这个民族的发展，这个国家的未来。围绕教育，他直接推动恢复高考制度、大量派遣留学生、建立中国自己的学位制度。现在看来，这些举措是从根本上解决了过去几十年，乃至未来国家建设所需要的源源不断的人才供给问题。

我是这三项教育改革措施的直接受益者。很难想象，没有这些改革，我的人生会是一个什么样子。至今，很多人不理解我，为什么几十年来，一直勤勤恳恳，努力工作？那是因为我知道，相对于那些因这样那样的运动，因家庭出身已经耽误了的人，相对于同龄人，我幸运，我抓住了那个只有可怜的不到 5% 的录取率机会，我没有理由不好好工作。否则，愧对改革者们所给予的厚望，愧对家人和亲朋好友所给予的支持。

依然是要照顾父亲，缓解家庭经济困难的原因，大学毕业后自己没有直接去接受自己很想接受的研究生教育，而是选择了留校任教。家庭困难有所缓解后，本来是备考中国科学院的研究生，但因所在学校所在专业有了招收可以带工资上学的在职研究生名额而改变了初衷，留在了单位攻读硕士学位。获得硕士学位后，自己的工作依然尽力尽责，教学深得学生喜爱，科学研究也多有成果产出。陕西师范大学最早，也是转让费最多的一项成果就出自以我自己为骨干的小组。我自己也有幸被破格评为副教授，在 36 岁时还被授予国务院特殊津贴，成为学校历史上差不多最年轻的一位享受此等荣誉的教师。

一晃，到了 36 岁，突然觉得不能再这样下去，必须进行新的抉择，要么继续留在单位，就这样毫无压力的，一切都显得顺理成章的工作下去；要么，在国内找个单位，攻读博士学位，然后再继续工作；再要么，干脆走出国门，接受挑战，感受西方发达国家的教学科研。慎重思考之后，决定还是要跟着感觉走，国家既然允许出国学习，为什么不抓住这个机遇，扩大视野、增加见识、历练自己、提高自己？

决定做出之后，真要付诸实践，还是要面临诸多困难。语言可以自己学，但出国学习所需机票费、学费、生活费根本负担不起，只能寻求资助。为此，查阅文献，广泛联系，功夫不负有心人，终于得到了世界级酶工程学者，英国 Birmingham 大学 John F. Kennedy 教授的邀请函，他答应我以访问学者身份到他的实验室工作，除了免除台板费（Bench Fee），还可以给予每月 300 多英镑的生活补贴。依此，我在 37 岁生日之前的一个月抵达 Birmingham 大学化学系，加入由来自意大利、西班牙、巴西、日本、马来西亚、中国和英国本土的学者或学生组成的，真正国际化的“碳水化合物和蛋白质工程实验室”，开始从事研究工作。期间，又另觅机会，获得英国政府海外杰出研究生奖学金（ORS Award）赴英国 Lancaster 大学高分子中心，师从国际著名光物理学者 Ian Soutar 教授攻读博士学位，专注高分子光物理研究工作。经过三年系统学习，于 1998 年 3 月顺利通过由英国皇家化学会后来的理事长，Imperial College 的 David Philips 教授和 Lancaster 大学高分子中心主任 John R. Ebdon 教授共同主持的博士学位论文

答辩。之后，受英中友好学会资助，继续留在 Ian Soutar 教授实验室工作。

回国服务

随着学业的完成，我又要就留在西方寻求发展，还是回国服务进行抉择。说实话，上世纪，我们国家的经济发展水平，人们的收入于今日不可同日而语。出国时，虽然我已经是副教授，每个月的工资也就两百多元。而我的女儿到了英国，每个月的儿童福利就达 40 多英镑，折合人民币至少也在 500 元，上学还不需要缴纳任何费用。在 Lancaster 大学攻读博士学位期间，导师考虑到我拖家带口，除了给予我常规博士生生活补贴之外，又从 Allied Colloids 公司为我争取到另一份补贴，合计津贴每月高达 700 多英镑，折合人名币差不多 1 万元，在国内这是不敢想象的收入。加之夫人在成年大学就读还不需要缴费，加班打打工每个月收入怎么也有几百英镑。可以说，经济毫无压力。我自己如果愿意留下来，或者移民，找份工作，收入一定还会更多，诱惑真的很大。

不过，我一直认为，人一辈子不能只考虑经济利益，还要考虑怎么才能够活得更有意义，更有尊严。特别是像我们这样的来自第三世界的访客，西方人在骨子里是不欢迎的，对此我深有感受。日常与发达国家同事尽管可以和平共事，甚至在需要时还可以相互帮助，但我们始终是异类。我的房东，已经在英国生活了几十年的香港人，邓先生一家感受更为深刻。当我完成学业决定回国工作时，他们一家是如此之高兴，竟然不在自己开设的店里，非得到八十多公里外的曼彻斯特为我设宴饯行。他们一家的观点一直是，中国强大，国人文明，海外华人才能扬眉吐气。多年间，邓先生一家宁愿以低价，也要将房产首先租给来自香港、大陆，或者台湾的学者、学生使用，以为同胞尽地主之谊。房东每看到来访的华人学者，来学习的华人留学生不好好工作，不好好学习时，就表达不满，就提出批评。房东一家的所作所为是对歌曲《我的中国心》的生动反映，也让我深受教育。确实是基因，是文化决定了我们必须为自己的国家繁荣富强做些事情，只有通过我们一代一代华人的接续努力，这个民族的命运才能够彻底改变，我们的子孙后代日子才能够变得好过。抱怨解决不了任何问题，逃避只能被人鄙视。当然，我的意思不是说只有回国才算爱国，身在海外照样可以为国家富强、民族进步做事。

事实上，一个人只有对自己国家的忠诚才会得到他人，包括西方发达国家民众的尊重。当我决定申请中国科学院在京一个研究机构岗位时，我的导师高兴的手舞足蹈，以至于与秘书配合，在不到十分钟内为我打印了一封热情洋溢，充满感情的推荐信。在他看来，我与很多人不一样，没有嫌弃自己的国家，而是毅然决然地决定回国服务。为此，他专门安排我陪他先去澳大利亚参加第 37 届世界高分子大会（World Polymer Congress），然后以借道北京回英国的方式安排我回国服务。目的只有一个，就是为我节省回国路费。因为他知道我回国后，收入将会骤减。至今想起这些点点滴滴，依然让人泪目！所以，我经常给年轻一代讲，是海外华人，是洋人教育了我。事实一再表明，在国外，要活得有尊严，就必须自重，就必须爱自己的国家，就不能逃避责任。同时，还要诚实，有正气，有同情心，这是人类都认同的优秀品质。

点滴感悟

不知不觉中，我来到这个世界已经接近 68 年，真正体会到了人生就像开弓箭，一旦射出，就只能前行，无法回头。一路走来，虽小有成绩，但走过的弯路太多，有些虽是大势所迫，有些却是自己不够敏锐或者不够努力，以至于过了本命年才得以出国学习。现在想来，起码有以下几点可以和年轻人分享：一是要有机遇意识。每个人的一生都会有一些机遇，这些机遇可以是上天馈赠，也可以是自己创造，机遇一旦抓住，个人的发展，生命的价值将大不相同；二是要懂得借力。亦即，要努力到好的平台，优秀的团队工作，这样才可以少些盲目摸索，少走些弯路，成长的快些；三是要持续奋斗。平台再好，机遇再多，个人不努力，能力跟不上，一切都是枉然；四是人生不可能一帆风顺。每个人的人生不尽相同，但坎坷一定都会有，只是有些人来的早些，有些人来的晚些，如何面对，心态最重要，要相信，上苍公平，天道酬勤。

我经常讲，教育责任重大，个体只是沧海一粟，个体的发展离不开社会的进步。我是教育的受益者，我更是改革开放大政方针的受益者。如果不是改革开放，我很难想象我们的国家会是一个什么样子？如果不是恢复高考制度，我的人生将怎么度过？因此，在毕业留校做了老师，特别是做了研究生导师后，我日益感受到自己责任的重大。有了这一认识，恪尽职守工作就成为当然选择，引导学生发展，建言青年教师成长，让他们尽可能少走些弯路也就成为自觉行动。

当然，我也认识到，个人的成长，主体是内因，包括家庭、导师、平台在内的外部环境均是外因。个人心态不好，努力不够，外部环境再好都没有用。此外，要认识到，人一辈子不可能一点遗憾不留，一点烦心事没有，重要的是，要相信，“事物都是一分为二的”“办法一定比困难多”“好事可以变坏事，坏事可以变好事”！要想有所作为，有所成就，就必须保持进取，就必须学会在逆境中不气馁，在顺境中不癫狂，任何时候都能够做到心态平和。

我还要说，作为老师，作为导师，富有同情心，拥有爱心至关重要。只有得到学生信任，才能让教育管用，才能让自己说话灵。我一直认为，心地不柔软的人不适合于当老师，也当不好老师，在个性空前彰显的今天，

更是这样。

谨以这些拉里拉杂，但却是肺腑之言作为结语。

2024 年 5 月 2 日于陕西师范大学长安校区

出国前与导师孙作民教授一起前往西北轻工业学院（现在的陕西科技大学）拜访田家乐教授（穿白衬衫者）（1993.05）

Before studying abroad, I went to the Northwest Institute of Light Industry (now Shaanxi University of Science and Technology) with my supervisor Prof. Sun Zuomin to visit Prof. Tian Jiale (in white shirt) （1993.05）

Note: As intelligent beings, people are faced with choices almost every day of their adult lives. How to make wise choices during the critical period is of great significance to individuals and families. A nation, a country, and even the whole world is a collection of individuals, and the maximum release of each individual's potential is the basis for the maximum development of society, therefore, the individual's choice is actually also related to the development and progress of society. Based on these considerations, I would like to use a few paragraphs to review the choices I made and the attitudes I adopted at several important points in my life, with a view to providing some advices and lessons for younger people.

Ten years ago, I wrote the article "A Retrospect and Broken Thoughts - My College" with the main content of "I want to go to college, I just want to study, and my academic tutors". Before I knew it, I had gone from being in my prime to being in my old age. Looking back on the choices I made and the attitudes I adopted during several critical periods in my life, it may be of some referential significance to younger people, and it will also leave a little memory for my daughter and granddaughter.

Taking the college entrance exam

I started my elementary school education in September 1963 and completed my junior high school education until July 1971 at Tongling Temple Elementary School in Lintong County, Shaanxi Province (now Lintong District, Xi'an City), a "hatted school" (Schools with the addition of higher education classes while the original structure remain unchanged) of "elementary school + junior high school", and I completed my senior high school education at Ma'e Middle School, which is less than 3 kilometers from my home. As far as I can remember, I never left Lintong County before completing my high school education. Luckily, my grandfather was an old traditional Chinese medicine doctor with a good reputation in the area, and my adopted sister (who later returned to her parents because of my family's political composition) was a junior high school student, and they taught me to study hard ever since I was a little bit old enough to know better. Although my father and mother were toiling farmers, they did everything they could to make sure that they could support my adopted sister and me in school, so much so that my biological sister, who was still in the third grade of elementary school, dropped out of school to be a farmer. As I grew older, I was able to understand my parents' helplessness, and it further deepened my deep guilt for my sister, who was only two years older than me.

The first grade of elementary school was a wonderful and memorable time. But the good times didn't last long, and from the second grade onwards, I began to encounter the Four Clean-ups (clearing accounts, clearing warehouses, clearing properties, and clearing work credits) Movement, and from the third grade onwards, I encountered the Cultural Revolution. A few years later, although the situation had improved, but the impact of the movement on normal school teaching activities was far from over, so that before entering high school, I did not have a chemistry class, and the junior high school physics class was only taught by a villager-funded teacher who probably only knew a little welding skills and had only junior high school level education. Frankly speaking, he couldn't teach clearly, and we couldn't understand even more, and a year's worth of physics classes could only pass the time around welding shows.

My high school education was completed at the already-mentioned Ma'e Middle School. Although this school was only a junior high school upgraded to a

在 Lancaster 大学 Polymer Center 从事时间分辨荧光测试（1995.10）
Working on time-resolved fluorescence testing at the Polymer Center, Lancaster University （1995.10）

senior high school, it was considerably better than that of my junior high school education. For one thing, the quality of the teaching staff was significantly better, and for another, the professional conduct of the teachers was completely different. To this day, I still remember very clearly that after entering high school, the school began to teach high school curriculum, which nowadays seems too simple to be taught, but the teachers realized that the knowledge base of these so-called junior high school graduates was so poor that it was impossible to organize normal teaching. To solve this problem, teachers of different courses took different measures. The vice principal, Mr. Wang Xianglin, who was in charge of our chemistry course, decided to devote a few weeks to intensive remedial work in junior high school chemistry. After that, a slightly more formal high school education took off slowly. However, the poisonous effects of the various movements on education had already penetrated so deep, and the teachers who were in charge of education had fears in rigorous teaching, and the "reading is useless", "the more knowledge you have, the more reactionary you are", "professionally proficient but not socialist-minded" and "White Professional Road" thinking was still prevalent, "rebellion is not guilty, rebellion is justified" has a big market, so except for a few bolder teachers, most teachers simply did not dare to let go of their hands and feet to set rules for students or conduct rigorous teaching.

After the "913 Incident" in 1971, under the personal promotion of Premier Zhou Enlai, education began to return to the right track, and schools and teachers were able to focus on education and teaching confidently. Correspondingly, the "Uselessness of Study Theory" that had been popular for many years gradually lost its market, and the hope for the restoration of the college entrance examination system began to appear. It became the dream of many young people at that time to study hard and change their destiny through examinations. As a member of that era, I was no exception, and I spent almost all the time on studying. In 1973, Lintong education department organized students from the county's seven high schools to participate in high school general mathematics and physics examinations, which was basically competitions, and I was one of the county's five full score examinees in mathematics, and my physics ranked third in the county with 93 points. These achievements further stimulated my learning motivation, enhanced my self-confidence, and also laid the foundation for my dream of college. However, after April 1973, the incident of Zhang Tiesheng's handing in blank exam papers and the incident of elementary school student Huang Shuai's countercurrent came one after another, and the hard-won return to normalcy of education once again suffered a huge impact. As a child in the countryside, the hope of changing one's fate through study was almost completely annihilated. There was no other choice but to return to the countryside to work as a farmer after graduating from high school.

Compared to my peers, fate was fair to me. A year later, I was fortunate enough to become a villager-funded teacher in a rural school, returning to the school of my dreams. One day in July 1977, I suddenly received a letter from a childhood friend of mine who had already been working in the city. He told me that he had learned on a business trip that the college entrance examination system that had existed before the Cultural Revolution would be reintroduced, and advised me to start preparing for it in advance. I was so excited by this news that I could not calm down for a long time. Soon after, the news was made public. People of all walks of life caught wind of the news, and young people of the right age were actively preparing for the exam. At that time, I was in a very special situation: my mother died of illness, my sister got married, and my father was sick and needed care. In addition, I was doing a smooth job in the school, which was highly praised by the teachers and students, and I was expected to be transferred to be a public teacher in a few years. Therefore, relatives, friends, colleagues more than persuade me to "resign yourself to fate, cherish the moment, and don't take the college entrance examination". At this critical point in my life, I had to make a choice. Until today, I still remember clearly that the choice I made at that time

was to follow my feelings. That is to say, no matter what, I would first earnestly prepare for the examination, because even if I participate, I might not be able to get admitted, and if I was fortunate enough to get admitted, I could choose not not go. If I really did not participate in the coveted college entrance examination, I would be forever regretful. Based on this consideration, in the following months, I almost devoted all my efforts, squeezed out almost all possible time, and finally went to the examination room to participate in the first resumed college entrance examination after the reinstatement of the college entrance examination system, on the conditions of taking care of my sick father and continuing the school work. A few months later, the good news came that I had been admitted to Shaanxi Normal University, which was not far from my home, as my first choice. It is conceivable that if I was not admitted, it might have been simpler, and at most I would have had some regrets and continued to teach and take care of my family as I had done in the past. Once admitted, it was really like before the examination that I had to persuade myself to give up the qualification and not go to college, but that was never acceptable. I had no choice but to follow my feelings once again, thinking that even if there were tons of difficulty, I would still have to go to college. Once decision is made, it cannot be changed. Thanks to my father's understanding of his son's inability to fulfill his filial piety every day in front of his bed, thanks to my then girlfriend, now my wife's full support, and thanks to the help of my friends and relatives over the years, which enabled me to fulfill my dream of going to university, and laid the foundation for me to be able to engage in the job of my own choice later on.

Studying abroad

At this age, I can feel more and more the greatness of the older generation of communists. Their opinions might differ slightly, but their original intention of serving the country and the people never changed. Deng Xiaoping, who had three ups and three downs, after resuming his work, did not care about his personal gains and losses, but first considered the development of this nation and the future of this country. He directly pushed forward the restoration of the college entrance examination system, the dispatch of a large number of students to study abroad, and the establishment of China's own degree system. In hindsight, these initiatives have fundamentally solved the problem of a constant supply of talents needed for the past few decades, and even for the future construction of the country.

I am a direct beneficiary of these three educational reform measures. It is hard to imagine what my life would have been like without these reforms. To this day, many people do not understand why I have been working diligently and hard for decades. That's because I know that, compared to those who have already been delayed due to those movements, due to their family background, and compared to my peers, I am lucky that I have seized the opportunity of that less than 5% admission rate, and there is no reason for me not to work hard. Otherwise, I would be ashamed of the high expectations of the reformers and the support by my family and friends.

Because I still had to take care of my father and alleviate my family's financial difficulties, I chose to stay in school and teach instead of going directly to graduate school, which I wanted to do. After the family's difficulties were alleviated, I originally prepared for the graduate school of the Chinese Academy of Sciences, but changed my mind and stayed in the university to study for a master's degree because my university's specialty offered an on-the-job postgraduate opportunity that allowed me to keep my salary while studying. After obtaining my master's degree, I continued to do my best in work, and my teaching was well received by students, and my scientific research yielded many results. One of the earliest achievements of Shaanxi Normal University, which was also the one with the largest transfer fee, came from the group with myself as the backbone researcher. I was also honored to be qualified as an associate professor, and at the age of 36, I was awarded the State Council Special Allowance, making me one of the youngest teachers in the history of the university to receive such an honor.

As if in a flash, I was already 36. I suddenly felt that I could not go on like this, and I must make a new choice, either continue to work in the university, so there was not much pressure, everything seemed to work logically; or I could find another institution in China and study for a doctorate degree, and then continue to work; or I could simply go study abroad, to accept the challenge, get a first hand feel of the teaching and research in the Western developed countries. After careful consideration, I decided that I should follow my feelings again. Since China allows me to study abroad, why don't I seize this opportunity to broaden my horizons, increase my knowledge, train and improve myself?

After the decision is made, there are still many difficulties to be faced when you really want to put it into practice. I could learn the language by myself, but I could not afford the airfare, tuition and living expenses for studying abroad, so I had to seek financial support. After reviewing the literature and making extensive contacts, I finally got an invitation letter from Prof. John F. Kennedy of the University of Birmingham, UK, a world-class enzyme engineering scholar, who promised me to work in his laboratory as a visiting scholar. And in addition to exempting the Bench Fee, he also gave me a living allowance of more than 300 pounds per month. I arrived at the Department of Chemistry of the University of Birmingham one month before my 37th birthday, and joined the truly international "Laboratory of Carbohydrate and Protein Engineering", which consisted of scholars or students from Italy, Spain, Brazil, Japan, Malaysia, China and the UK, and started to conduct research. I started my research career in the Laboratory of Carbohydrate and Protein Engineering. During this period, I also found another opportunity to

obtain the British Government Overseas Research Scholarship (ORS Award) to study at the Polymer Center of the University of Lancaster, UK, under the supervision of Prof. Ian Soutar, an internationally renowned photophysicist, for my PhD degree, focusing on the research of polymer photophysics. After three years of systematic study, I successfully defended my doctoral dissertation in March 1998, which was jointly chaired by Prof. David Philips of Imperial College, who were later the chair of the Royal Society of Chemistry, and Prof. John R. Ebdon, director of the Centre for Macromolecules of Lancaster University. After that, I continued to work in Prof. Ian Soutar's laboratory under the sponsorship of the British-Chinese Friendship Society.

Returning to China

As I finished my studies, I had to decide whether to stay in the West and seek development or return to my home country to serve. To be honest, in the last century, China's level of economic development and people's income were not comparable to today's. When I went abroad, although I was already an associate professor, my monthly salary was only about 200 CNY yuan. When my daughter arrived in the UK, the monthly child welfare amounted to more than 40 pounds, equivalent to at least 500 yuan, and she did not need to pay any fees to go to school. During my doctorate program in Lancaster University, the supervisor took into account of my family burden, and in addition to giving me the regular doctoral living allowance, he got another allowance for me from Allied Colloids Company, so the total allowance per month was more than 700 pounds, equivalent to almost 10,000 yuan, an amount unimaginable in China. In addition, my wife did not need to pay tuition in the adult university, and she could make another few hundred pounds every month from part-time job. It can be said that there was no financial pressure. As for myself, if I was willing to stay, or immigrate, I could easily find a job, and the income would be even more, the temptation being really great.

However, I have always believed that one should not only think about the financial gains in one's life, but also consider how one can live a meaningful and dignified life. In particular, visitors from the Third World like us were not welcomed by Westerners at heart, and I felt this very much. Even though we can work peacefully with our colleagues in developed countries and even help each other when needed, we are always foreigners. My landlord, Mr. Tang and his family, who had been living in the UK for decades, felt this even more deeply. When I finished my studies and decided to go back to China, the Tang family was so happy that they had to go to Manchester, more than 80 kilometers away, to host a farewell banquet for me, instead in their own restaurant. Their view has always been that only when China is strong and civilized can overseas Chinese people raise their eyebrows. Over the years, Mr. Deng's family has preferred to rent their properties to scholars and students from Hong Kong, mainland China or Taiwan at low prices, in order to do the landlord's duty to their compatriots. Whenever the landlord saw that visiting Chinese scholars and Chinese students were not working or studying properly, he expressed his dissatisfaction and criticized them. The behavior of the landlord's family is a vivid reflection of the song "My Chinese Heart", which also educated me deeply. It is indeed the genes and the culture that determine that we must do something for the prosperity and strength of our own country, and it is only through the successive endeavors of our generations of Chinese that the destiny of this nation can be completely changed, and that the days of our children and grandchildren can become better. Complaining will not solve any problem, and avoiding will only be despised. Of course, I don't mean to say that only returning to China is considered patriotic, as we can still do something for the progress of the nation when we are abroad.

Indeed, one can only be respected by others, including the people of developed Western countries, if one is loyal to one's own country. When I decided to apply for a position at a research institute of the Chinese Academy of Sciences in Beijing, my mentor was so overjoyed that he cooperated with his secretary to print out an enthusiastic and emotional letter of recommendation for me in less than ten minutes. In his opinion, I, unlike many others, had not disliked my country, but had resolutely decided to return to serve it. For this reason, he arranged for me to accompany him to Australia to attend the 37th World Polymer Congress, and then arranged for me to return to China by way of returning to the UK via Beijing. The only purpose was to save my traveling expenses back to China. He knew that my income would be reduced after I returned to China. It still brings tears to my eyes when I think of all these! Therefore, I often tell the younger generation that it is the overseas Chinese, the foreigners, who have educated me. Facts have shown time and again that in order to live with dignity in foreign countries, one must have self-respect, one must love one's own country, and one must not shirk one's responsibilities. At the same time, one must be honest, have integrity and compassion, which are excellent qualities recognized by all human beings.

Some Insights

Unconsciously, It has been almost 68 years since I came to this world. I really realized that life is like a bow and arrow, once shot, can only go forward, and can not turn back. Along the way, although I have made small achievements, but there were too many detours, some of which were forced by the situation, some of which were because I was not smart enough or not hardworking enough, so that I only went abroad to study after turning 36. Now that I think about it, at least the following points can be shared with young people: First, there should be a sense of opportunity. Everyone's life will have some opportunities, which can be the gift of God, or their own creation. Once the opportunity is seized, personal development and the value of life will

be very different; Second, know how to leverage the strengths of others. That is, to work at a good platform, in an excellent team, so that there will be less blind fumbling, less detours, and you can grow faster; Third, continue to struggle. Even if the platform is good, the opportunities are plenty, all in vain if personal efforts and ability do not keep up; Fourth, life can not be smooth sailing. Everyone's life is not the same, but there will be bumps in the road. Some people come earlier, some people come later. how to face, The mentality is the most important thing when you face these, and we must believe that God is fair and heaven rewards hard work.

I often say that education is a great responsibility, that individuals are only a drop in the ocean, and that the development of individuals cannot be separated from the progress of society. I am a beneficiary of education, and I am even a beneficiary of the reform and opening-up policy. If it were not for the reform and opening up, I can hardly imagine what our country would be like. How would I have spent my life if the college entrance examination system had not been restored? Therefore, after I graduated and worked in university as a teacher, especially after I became a graduate supervisor, I increasingly felt the great responsibility of my own. With this realization, it became a matter of course to work conscientiously, to guide the development of students, to advise the growth of young teachers, and to let them take the least possible detour.

Of course, I also realize that for personal growth, it is mainly the internal cause, while other external environment factors are external causes, including the family, mentor, and platform. If you have a bad mindset and don't work hard enough, the external environment is useless. In addition, it is important to recognize that a person's life can not be free of some regret, or a little bit of trouble. It is important to believe that, "Every coin has two sides", "There are more solutions than difficulties", and "Good things can become bad things, bad things can become good things"! To make a difference and achieve something, we must remain enterprising, we must learn not to be discouraged in adversity, not to go mad in good times, and to be able to achieve peace of mind at all times.

博士学位论文答辩后与导师等的合影，从右至左：Prof. Ian Soutar, Prof. John R. Ebdon, 作者本人，Prof. David Philips, Dr. Linda Swansea （Ian Soutar 的助手）（1998.03）

Photo with advisors and defense committee after doctoral dissertation defense, from right to left: Prof. Ian Soutar, Prof. John R. Ebdon, myself, Prof. David Philips, Dr. Linda Swansea (assistant to Ian Soutar) (1998.03)

I would also say that as a teacher, as a mentor, it is vital to be compassionate and to have love. Only when you have the trust of your students can you make your education work and make your words talk. I have always believed that people who are not soft-hearted are not suited to be teachers, nor do they work well as teachers, even more so in today's world where individuality is more prominent than ever.

I would like to conclude with these verbose but heartfelt words.

May 2, 2024 at Chang'an Campus, Shaanxi Normal University

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Designed by FanForm Art Space