陕西师范大学 SHAANXI NORMAL UNIVERSITY

西安交通大学 XIAN JIAOTONG UNIVERSITY

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简报
Newsletter

新概念传感器与分子材料研究院
Institute of New Concept Sensors and Molecular Materials

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房喻院士在《教育与装备研究》发表文章谈素养为要新课程理念

Fang Yu publishes an article in Education and Equipment Research discussing new curriculum concept of emphasizing competency

近日，房喻院士在《教育与装备研究》2025年第8期“学科教学装备配置标准”专栏发表了题为“以教学装备配置新标准的实施促进素养为要新课程理念的落实”的文章。

《教育与装备研究》是教育部主管、教育部教育技术与资源发展中心（中央电化教育馆）主办的期刊，由中国电化教育杂志社编辑出版，侧重教育装备的教学应用，栏目包括“科学教育”“实验教学”“国家智慧教育平台应用”等。


《教育与装备研究》2025年第8期目录

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Recently, ProfFang Yu published an article titled “Promoting the Implementation of New Curriculum Concepts Focusing on Competency Development through the Implementation of New Standards for Teaching Equipment Configuration” in the “Standards for Discipline Teaching Equipment Configuration” column of the August 2025 issue of Education and Equipment Research.

Education and Equipment Research is a journal supervised by the Ministry of Education and sponsored by the MOE’s Center for Educational Technology and Resource Development (National Center for Educational Technology). It is edited and published by the Chinese Educational Technology Magazine and focuses on the teaching applications of educational equipment with columns such as Science Education, Experimental Teaching, National Smart Education Platform Applications, and others.

房喻院士和彭浩南教授出席国家毒品实验室陕西分中心第一届学术委员会第三次会议

Fang Yu and Peng Haonan attend academic committee meeting of National Anti-Drug Laboratory Shaanxi Regional Center

2025年8月8日上午，新概念传感器与分子材料研究院房喻院士和彭浩南教授出席了国家毒品实验室陕西分中心第一届学术委员会第三次会议。

学术委员会主任委员房喻院士主持会议并作总结讲话。

会议决定增选研究院丁立平教授为新一届委员会委员。彭浩南教授就《基于荧光纳米膜传感列阵的合成大麻素快速检测与干扰物区分技术》课题进行了汇报。

On August 8, 2025, Prof. Fang Yu and Prof. Peng Haonan of the Institute of New Concept Sensors and Molecular Materials attended the third meeting of the first academic committee of the National Anti-Drug Laboratory Shaanxi Regional Center.

Fang Yu, as the chairman of the academic committee, presided over the meeting and made a concluding speech.

Prof. Ding Liping of the institute was elected as a member of the new committee at the meeting. Peng Haonan reported on the topic of “Rapid Detection of Synthetic Cannabinoids and Distinction of Interfering Substances Based on Fluorescent Nanomembrane Sensor Arrays.”

房喻院士出席西北工业大学高分子材料南山论坛并作报告

Fang Yu speaks at NPU Nanshan Forum on Polymer Materials

2025 年 8 月 14 日，房喻院士出席在西北工业大学长安校区举办的西北工业大学高分子材料南山论坛暨陕西省高分子科学与技术重点实验室学术会议，并作题为“传感驱动的分子材料创新”的主旨报告。

本次论坛由西北工业大学学科建设办公室、人力资源部共同主办，化学与化工学院、陕西省高分子科学与技术重点实验室、特种功能与智能高分子材料工信部重点实验室联合承办。四川大学王玉忠教授、西安交通大学张立群教授及近百位省内外高分子领域的国家级人才和专家学者参加了论坛。

On August 14, 2025, Prof. Fang Yu attended the Nanshan Forum on Polymer Materials of Northwestern Polytechnical University and the Academic Conference of Shaanxi Key Laboratory of Polymer Science and Technology held at the Chang’an Campus of Northwestern Polytechnical University, and delivered a keynote speech titled “Sensing-Driven Innovation in Molecular Materials”.

This forum was jointly hosted by the Office of Discipline Construction and the Human Resources Department of Northwestern Polytechnical University, and co-organized by the School of Chemistry and Chemical Engineering, the Key Laboratory of Polymer Science and Technology of Shaanxi Province, and the Key Laboratory of Special Functional and Intelligent Polymer Materials of the Ministry of Industry and Information Technology. Prof. Wang Yuzhong from Sichuan University, Prof. Zhang Liqun from Xi’an Jiaotong University, and about a hundred national-level experts and scholars in the field of polymer science from across China attended the forum.

苗荣和刘忠山副教授参加 2025 六盘山论坛并作邀请报告

Miao Rong and Liu Zhongshan present invited reports at 2025 Liupanshan Forum

2025 年 8 月 18 至 22 日，新概念传感器与分子材料研究院苗荣副教授和刘忠山副教授参加了在宁夏固原举办的“2025 六盘山论坛”。

苗荣和刘忠山分别在超分子分会作了题为“吡咯基有机染料激发态调控及其应用”和“基于动态亚胺化学的共价有机框架材料回收”的邀请报告，介绍了近年来研究院在功能荧光小分子和晶态材料方面的研究进展。

From August 18 to 22, 2025, Assoc. Profs. Miao Rong and Liu Zhongshan from the Institute of New Concept Sensors and Molecular Materials attended 2025 Liupanshan Forum in Guyuan, Ningxia.

Miao Rong and Liu Zhongshan presented invited reports titled “Excited-State Regulation and Applications of Pyrrole Derivatives-Substituted

Fluorophores" and "Closed-Loop Recycling of Covalent Organic Frameworks through Dynamic Imine Chemistry" respectively in the Supramolecular Materials session, introducing INCSMM research progress in small functional fluorescent molecules and shaping crystalline material recycling.

房喻院士出席第八届新型功能材料研讨会

Fang Yu speaks at 8th Symposium on Novel Functional Materials

2025 年 8 月 22 日，房喻院士出席了在宁夏师范大学举办的第八届新型功能材料研讨会，并在开幕式上致辞。

房喻表示，此次研讨会是交流新型发光材料研究成果、探讨聚集体科学前沿挑战的重要平台，是推动聚集体材料产学研用融合发展的生动实践。聚集诱导发光（AIE）概念由唐本忠院士团队首先提出并命名，AIE 材料是为数不多的由中国科学家原创并造福人类的新材料，AIE 材料在光电器件、生物成像、传感器等领域具有广泛的应用潜力与研究价值。期望与会专家学者、企业代表在学术交流和思想碰撞中激发灵感、收获成长，全力以赴推动新型功能材料研究实现跨越式创新发展。

陕西师范大学新概念传感器与分子材料研究院彭浩南教授，西安交通大学新概念传感器与分子材料研究院何刚教授和刘峰教授参加了会议。

本次会议由宁夏师范大学主办、宁夏师范大学化学化工学院承办，中国化学会物理化学学科委员会协办，唐本忠院士担任本届研讨会主席，来自全国高校、科研院所近 60 位专家学者参加了会议。

On August 22, 2025, Prof. Fang Yu attended the 8th Symposium on Novel Functional Materials held at Ningxia Normal University and delivered a speech at the opening ceremony.

Fang Yu said that this symposium serves as a vital platform for sharing research findings on novel luminescent materials and exploring cutting-edge challenges in aggregate science, representing a dynamic practice in advancing the integrated development of aggregate materials across industry, academia, research, and application. The concept of Aggregation-Induced Emission (AIE) was first proposed and named by the research team led by Academician Tang Benzhong. AIE materials represent one of the few novel materials originally created by Chinese scientists that benefit humanity. They hold extensive application potential and research value in fields such as optoelectronic devices, bioimaging, and sensors. He hoped that participating experts, scholars, and corporate representatives would gain inspiration and achieve growth through academic exchanges and intellectual discussions, striving to propel breakthrough innovations in the research of novel functional materials.

Prof. Peng Haonan from the Institute of New Concept Sensors and Molecular Materials at Shaanxi Normal University, along with Professors He Gang and Liu Feng from the Institute of New Concept Sensors and Molecular Materials at Xi'an Jiaotong University, attended the symposium .

This symposium was hosted by Ningxia Normal University and organized by its School of Chemistry and Chemical Engineering, with support from the Physical Chemistry Committee of the Chinese Chemical Society. Academician Tang Benzhong served as the chairperson of this symposium, which was attended by nearly 60 experts and scholars from universities and research institutions across the country.

房喻院士出席中国化学会第四届农业化学学术讨论会

Fang Yu attends CCS Fourth Agricultural Chemistry Symposium

2025 年 8 月 23 日，新概念传感器与分子材料研究院房喻院士应邀赴陕西杨凌出席了"中国化学会第四届农业化学学术讨论会"，并担任大会报告主持。

此次会议由中国化学会农业化学专业委员会主办、西北农林科技大学承办，研究院彭浩南教授和刘忠山副教授参加了会议。

本次会议以“化学新质生产力，丝路农业再起航”为主题，设立五个分会场，涵盖“绿色农用化学品创制与应用”“农业面源污染物治理与食品安全”“先进材料与旱区农业”“AI赋能化学教育及卓越农林人才培养”以及“博士生论坛”。与会专家围绕农业化学领域的前沿技术、学术热点与难点问题展开交流，共同推动农业化学学科的创新与发展。

On August 23, 2025, Prof. Fang Yu of the Institute of New Concept Sensors and Molecular Materials, attended the “Fourth Agricultural Chemistry Symposium of the Chinese Chemical Society” in Yangling, Shaanxi, and served as a chairperson of the conference reports.

The symposium was hosted by the Agricultural Chemistry Professional Committee of the Chinese Chemical Society and organized by Northwest A&F University. INCSMM Prof. Peng Haonan and Assoc. Prof. Liu Zhongshan attended the conference.

This conference, with the theme of “New Chemistry Productivity for Re-launch of Silk Road Agriculture”, set up five sub-symposiums, covering “Creation and Application of Green Agricultural Chemicals”, “Treatment and Food Safety of Agricultural Flour Source Pollutants”, “Advanced Materials and Dryland Agriculture”, “AI Empowering Chemical Education and Excellent Agricultural and Forestry Talent Cultivation”, and “Doctoral Forum”. The experts attending the conference exchanged views on the cutting-edge technologies, academic hotspots and difficult issues in the field of agricultural chemistry, jointly promoting the innovation and development of agricultural chemistry discipline.

研究院团队在 2025 年中国大学生机械工程创新创意大赛上获得佳绩

INCSMM teams win prizes at 2025 China Mechanical Engineering Innovation and Creativity Competition for University Students

2025 年 8 月 26 日，新概念传感器与分子材料研究院团队两支参赛队伍在山东省烟台市举办的“2025 年中国大学生机械工程创新创意大赛：第六届‘明石杯’微纳传感技术与智能应用赛”全国总决赛上分别获得研究生组一等奖和二等奖。

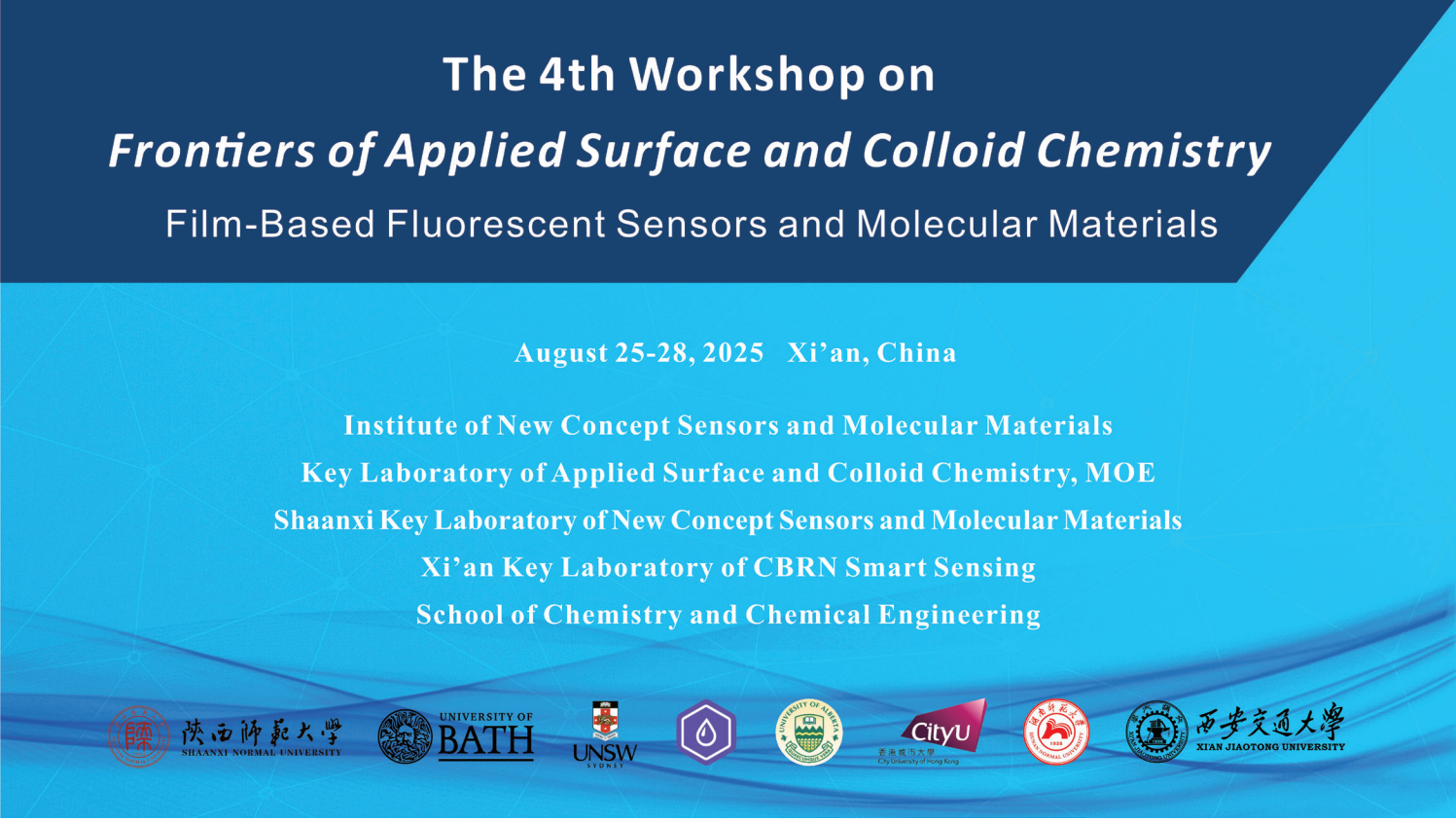
刘忠山副教授、罗艳彦工程师指导，2023 级硕士研究生王俊杰及团队成员的项目《超贴合透气性纳米薄膜表皮电极用于生理健康监测》获得一等奖；刘太宏副教授、罗艳彦工程师指导，2023 级硕士研究生陈周玉及团队成员的项目《痕“苯”大侦探—基于苝二酰亚胺衍生物的超灵敏苯系物传感器》获得二等奖。

本届大赛共有 236 支本、专科生组参赛队、133 支研究生组参赛队、369 支行业参赛队进入全国总决赛，最终评选出一等奖 30 个、二等奖 113 个、三等奖 73 个。

On August 26, 2025, two teams from the Institute of New Concept Sensors and Molecular Materials won one first prize and one second prize in the postgraduate group at the national finals of the “2025 China Mechanical Engineering innovation and Creativity Competition for University Students: The Sixth ‘Bright Stone Cup’ Micro-Nano Sensing Technology and Intelligent Application Competition” held in Yantai City, Shandong Province.

Under the guidance of A/Prof. Liu Zhongshan and Engineer Luo Yanyan, Wang Junjie, a Class 2026 master’s student, and his team members won the first prize with the project “Super-Adhesive Breathable Nano-film Epidermal Electrode for Physiological Health Monitoring”; and under the guidance of A/Prof. Liu Taihong and Engineer Luo Yanyan, Chen Zhouyu, a Class 2026 master’s student, and her team members won the second prize with the project “‘Benzene’ Trace Detective - Ultra-Sensitive Benzene Series Sensor Based on Perylene Diimide Derivatives”.

236 undergraduate and junior college student teams, 133 graduate student teams, and 369 industry teams advanced to the national finals, and ultimately, 30 first prizes, 113 second prizes, and 73 third prizes were awarded.



第四届应用表面与胶体化学前沿论坛举行

The Fourth Workshop on Frontiers of Applied Surface and Colloid Chemistry held

2025 年 8 月 25 至 28 日，为期四天的第四届应用表面与胶体化学前沿论坛在陕西师范大学召开。

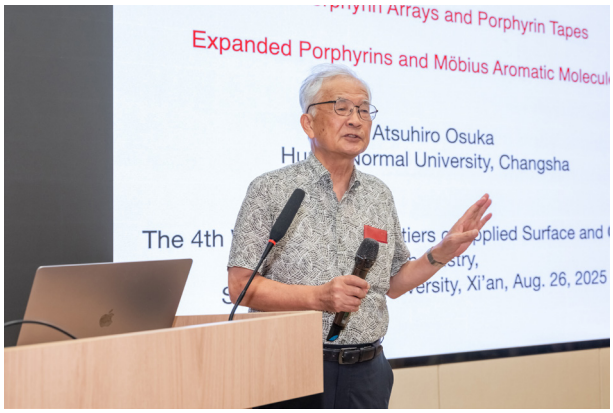
8 月 26 日上午，来自中国、英国、澳大利亚、俄罗斯和日本的专家学者、陕西师范大学和西安交通大学教师和研究生及国际来华留学生约 100 余人参加了在新概念传感器与分子材料研究院报告厅举行的开幕式，开幕式由副院长丁立平教授主持。

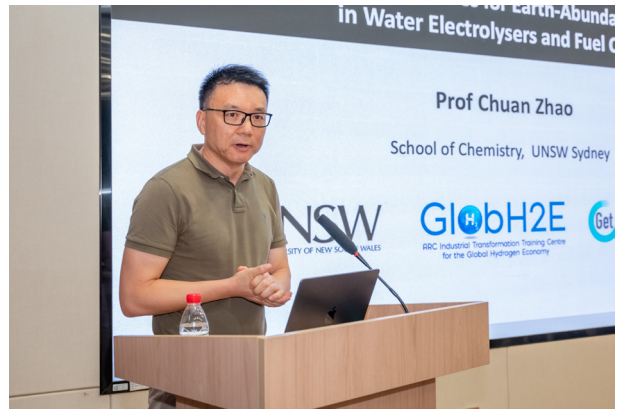
开幕式上，陕西师范大学化学化工学院院长刘成辉教授致辞，对与会嘉宾与广大师生表示欢迎，并祝论坛圆满成功。

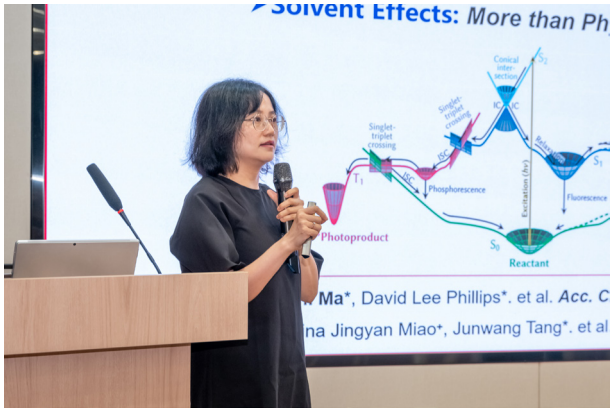
论坛报告分为上下午各两个时段进行。上午第一时段，日本京都大学 / 湖南师范大学 Atsuhiro Osuka 教授、澳大利亚新南威尔士大学赵川教授分别作了题为 Synthetic Porphyrinoid Chemistry 和 Capture and Mitigate the Degradation of Non-Platinum Catalysts in Proton Exchange Membrane Fuel Cells 的学术报告，报告由西安交通大学刘峰教授主持。

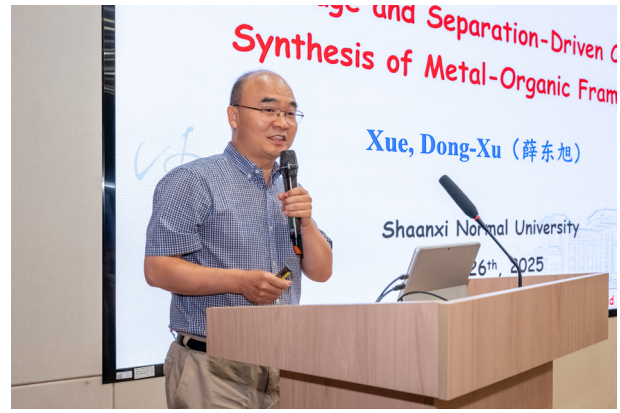
上午第二时段，加拿大阿尔伯塔大学曾宏波教授、英国巴斯大学 Tony David James 教授和陕西师范大学马佳妮教授分别作了题为 Advancing Soft Materials and Interfaces through Reversible and Tunable Molecular Interactions、Fluorescent Chemosensors and Imaging Agents

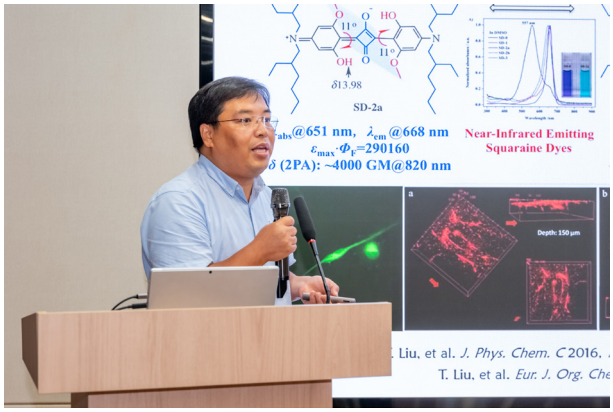
八月大事记 Events in August











和 Photochemical Reaction Mechanism Studies on Selected Organic Molecules 的报告，报告由陕西师范大学彭军霞教授主持。

下午第一时段，俄罗斯科学院 Nugzar Zhoraevich Mamardashvili 教授、伊万诺沃国立化学技术大学 Usacheva Tatyana 教授和西安交通大学何刚教授分别作了题为 Design and Sensor Properties of Langmuir–Schaefer Porphyrin Films Towards Substrates of Differenet Nature、Inclusion Complexation of Crown Esters and Cyclodextrins in Water Organic Solvents: Thermodynamic Description and Prospectives of Practical Application 和 Chalcogenoviologen Based Photoelectric Functional Colloids and Interface 的报告，报告由陕西师范大学彭浩南教授主持。

下午第二时段，香港城市大学张其春教授、陕西师范大学薛东旭教授和刘太宏副教授分别作了题为 Roadmap Towards Single Crystals of Covalent Organic Polymers/Frameworks、Gas Storage and Separation Driven Controllable Synthesis of Metal Organic Frameworks 和 NIR Two Photon Absorption and Ultrafast Excited State Dynamics of Quadrupolar Photosensitizers 的报告，报告由陕西师范大学刘凯强

教授主持。

最后，房喻院士作了总结发言，回顾了自 2014 年第一届应用表面与胶体化学前沿论坛召开以来的国际学术交流与发展，希望大家“海内存知己，天涯若比邻；愿君多珍重，常聚莫相忘。”

报告结束后，与会专家学者还进行了自由讨论交流等学术活动，并参观了研究院实验室和师大校园。

此次研讨会由应用表面与胶体化学化学教育部重点实验室、陕西省新概念传感器及分子材料重点实验室、西安市化生核放智能感知重点实验室、陕西师范大学化学化工学院和西安交通大学新概念传感器与分子材料研究院联合主办。

From August 25th to 28th, 2025, the Fourth Workshop on Frontier of Applied Surface and Colloid Chemistry was held at Shaanxi Normal University.

On the morning of August 26th, about 100 experts and scholars from China, the United Kingdom, Australia, Russia and Japan, as well as teachers and graduate students and international students from Shaanxi Normal University and Xi'an Jiaotong University, attended the opening ceremony held in the lecture hall of the Institute of New Concept Sensors and Molecular Materials, which was presided over by INCSMM vice dean Prof. Ding Liping.

At the opening ceremony, Prof. Liu Chenghui, dean of the School of Chemistry and Chemical Engineering, delivered a speech welcoming the guests, teachers and students, and wishing the workshop success.

The workshop presentations were divided into two sessions each in the morning and afternoon. In the first morning session, Prof. Atsuhiro Osuka from Kyoto University, Japan/Hunan Normal University. China and Prof. Chuan Zhao from the University of New South Wales, Australia presented reports titled Synthetic Porphyrinoid Chemistry and Capture and Mitigate the Degradation of Non-Platinum Catalysts in Proton Exchange Membrane Fuel Cells, respectively. The session was chaired by Prof. Liu Feng from Xi'an Jiaotong University.

In the second session of the morning, Prof. Hongbo Zeng from the University of Alberta, Canada, Prof. Tony David James from the University of Bath, UK, and Prof. Ma Jiani from Shaanxi Normal University presented reports titled Advancing Soft Materials and Interfaces through Reversible and Tunable Molecular Interactions, Fluorescent Chemosensors and Imaging Agents, and Photochemical Reaction Mechanism Studies on Selected Organic Molecules, respectively. The session was chaired by Prof. Peng Junxia from Shaanxi Normal University.

In the first afternoon session, Prof. Nugzar Zhoraevich Mamardashvili from the Russian Academy of Sciences, Prof.

Usacheva Tatyana from Ivanovo State University of Chemistry and Technology, Russia and Prof. He Gang from Xi'an Jiaotong University presented reports titled "Design and Sensor Properties of Langmuir-Blodgett Porphyrin Films for Substrates with Different Properties", "Inclusion Complex Formation of Crown Esters and Cyclodextrins in Aqueous Phase: Thermodynamic Description and Application Prospects", and "Photofunctional Colloids and Interfaces Based on Chalcogenyl Pyrrolidones," respectively. The session was chaired by Prof. Peng Haonan from Shaanxi Normal University.

In the second afternoon session, Prof. Qichun Zhang from the City University of Hong Kong, Prof. Xue Dongxu and Assoc. Prof. Liu Taihong from Shaanxi Normal University presented reports titled "Roadmap Towards Single Crystals of Covalent Organic Polymers/Frameworks", "Gas Storage and Separation-Driven Controllable Synthesis of Metal-Organic Frameworks", and "NIR Two-Photon Absorption and Ultrafast Excited State Dynamics of Quadrupolar Photosensitizers", respectively. The session was chaired by Prof. Liu Kaiqiang from Shaanxi Normal University.

In the end, Prof. Fang Yu delivered a concluding speech, reflecting on the international academic exchanges and advancements since the inaugural Frontier Forum on Applied Surface and Colloid Chemistry in 2014, and hoped that "May there be forever friendship and no distance between friends. Take good care and never forget to meet as often as you can."

After the reports, the participating experts and scholars also engaged in academic activities such as free discussion and exchange, and visited the INCSMM laboratories and SNNU campus.

The workshop was jointly sponsored by the Ministry of Education Key Laboratory of Applied Surface and Colloid Chemistry, Shaanxi Key Laboratory of New Concept Sensors and Molecular Materials, Xi'an Key Laboratory of CBRN Smart Sensing, SNNU School of Chemistry and Chemical Engineering and XJTU Institute of New Concept Sensors and Molecular Materials.

刘忠山副教授参加第五届国际多孔有机聚合物学术研讨会并作邀请报告

Liu Zhongshan presents at 5th Int'l Symposium on Porous Organic Polymers

2025 年 8 月 24 至 28 日，新概念传感器与分子材料研究院刘忠山副教授和井燚淼、丁璐瑶、肖世栋、钟笑笑等四名研究生参加了在湖北恩施举办的"第五届国际多孔有机聚合物学术研讨会"。

刘忠山应邀在材料设计与合成分会作了题为"共价有机框架材料的成型与回收"的邀请报告，介绍了近年来课题组在晶态材料成型和回收方面取得的研究进展。

本次会议由华中科技大学和江汉大学联合主办，来自世界各地的 300 余位专家学者参加论坛。

From August 24 to 28, 2025, Assoc. Prof. Liu Zhongshan and M.S. candidates Jing Yimiao, Ding Luyao, Xiao Shidong and Zhong Xiaoxiao from the Institute of New Concept Sensors and Molecular Materials attended the 5th International Symposium on Porous Organic Polymers (POPs 2025) held in Enshi, Hubei Province.

Liu Zhongshan presented an invited report titled "The Shaping and Recycling of Covalent Organic Frameworks" in the Materials Design and Synthesis session, introducing their research progress on the shaping and recycling of crystalline materials.

The conference was jointly organized by Huazhong University of Science and Technology and Jianghan University, and attended by more than 300 experts and scholars from around the world working on porous organic materials.

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Single-component-based multicolor emissions enabled by symmetry breaking

Simin Lin, Xubin Wang, Huisi Li, Jiancheng Zhou, Ruijuan Wen, Jianfei Ma, Shiwei Yin, Ling-Ya Peng ✉, Haonan Peng ✉ & Yu Fang ✉

Nature Communications **16**, Article number: 8130 (2025) | Cite this article

对称性破缺诱导单荧光组分分子激发波长依赖多色发光

Simin Lin, Xubin Wang, Huisi Li, Jiancheng Zhou, Ruijuan Wen, Jianfei Ma, Shiwei Yin, Ling-Ya Peng, Haonan Peng, Yu Fang. Nat. Commun. 16, 8130 (2025). DOI: 10.1038/s41467-025-63519-7

有机荧光材料（OFMs）多为“固定发射”，在多功能场景中的适配性受限。相较之下，激发依赖型（Ex–de）材料可随激发波长动态、可逆地呈现多色发光，在防伪、加密 / 解密、传感等方面潜力巨大。然而，现有实现路径多依赖多发光体的共结晶 / 共聚或固态聚集构筑，易引入色彩老化、相分离与稳定性下降的问题，且常需晶体堆积才能稳定多构象，难以兼顾溶液、非晶与晶态“三态”普适性。为此，亟需一种在“单分子、跨形态”层面调控激发态弛豫通道的普适策略。

本工作报道了一种“分子对称性破缺”策略：通过在三脚架式星形骨架中引入体积庞大的 o–carborane– 芳基分支，设计合成分子 Ph–3CP，使三支非平面分支在空间受限下形成“本征不等价性”，由此在单一分子中实现丰富的激发态电子过程。该分子在溶液、非晶和晶体三种形态下均表现出近 175 nm 的宽谱 Ex–de 多色发光；通过改变结晶溶剂获得四种多晶型，直接捕获多种不对称构象，为理论预测的对称性破缺提供实证支撑。体系层面的构效研究表明，Ph–3CP 存在局域激发（LE）与两类电荷转移（CT1/CT2）三种 S1 态，并可沿两条主导弛豫路径（LE↔CT1、LE↔CT2）选择性辐射跃迁；时间分辨与瞬态吸收进一步揭示了 LE→CT2 的动力学演化，

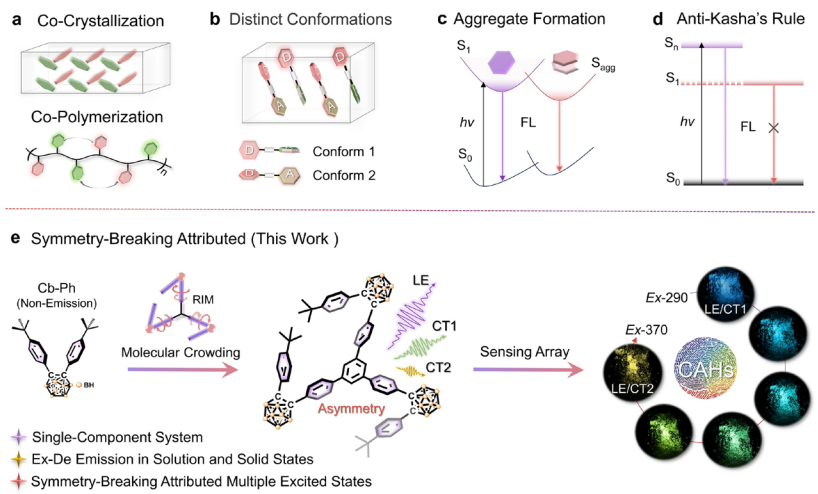

图 1. 激发波长依赖多色发光分子设计策略。（a–d）已报道的激发波长依赖多色发光分子体系示意图；（e）对称性破缺的星型分子结构设计示意图。

Fig. 1. Representative strategies for excitation-dependent multicolor emissions. a–d Schematic diagram of the reported strategies for excitation-dependence (Ex-de) multi-color emissions. e The strategy of symmetry-breaking in a star-shaped fluorophore to generate multiple excited states.

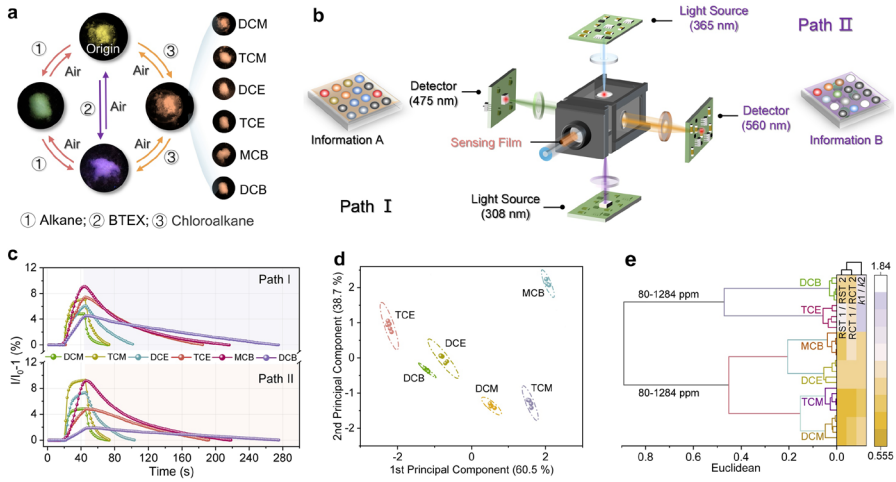

图 2. 单组分阵列型荧光传感器应用。（a）Ph−3CP 硅胶粉对烷烃、BTEX 以及氯代烃饱和蒸气的可视化响应示意图（λex = 365 nm）；（b）单组分阵列型荧光传感器装置示意图；（c）传感器对六种氯代烃的响应曲线；（d）基于二维主成分分析与（e）层次聚类分析区分六种氯代烃蒸气。

Fig. 2. Application in single-component fluorescence sensor array. a Schematic illustration of the response of Ph-3CP silica powder to saturated vapor of alkane, BTEX and chloroalkanes, respectively (λex = 365 nm). b Schematic illustration of the homemade single-fluorophore-based sensor array device. c Response traces of the sensor array to six chlorinated hydrocarbons. d Two-dimensional PCA score plot and e hierarchical cluster analysis (HCA) heat map discriminating vapor of the six chlorinated hydrocarbons.

以及对应寿命（如 ~0.25 ns、~3.88 ns 与 ~36.02 ns 的多时标特征），明确多色发光的“单分子起源”和“跨形态复现”。

第一作者：陕西师范大学博士研究生林思敏、王旭斌

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全文链接：https://doi.org/10.1038/s41467−025−63519−7

Conventional organic fluorescent materials (OFMs) typically exhibit fixed emission spectra, which limits their adaptability in multifunctional applications. By contrast, excitation-dependent (Ex-de) luminophores enable dynamic and reversible multicolor emissions upon tuning the excitation wavelength, greatly expanding their potential in areas such as anti-counterfeiting, encryption/decryption, and sensing. However, the development of Ex-de materials faces major challenges: traditional approaches often rely on co-crystallization or copolymerization of multiple luminophores, which can cause color aging, phase separation, and compromised stability. Moreover, these methods frequently depend on crystal packing to stabilize multiple conformers, making it difficult to achieve generality across solution, amorphous, and crystalline states. Thus, a universal strategy to regulate excited-state relaxation pathways within a single molecule across different physical states is urgently needed.

This work reported in Nature Communications a molecular symmetry-breaking strategy to enrich accessible electronic processes in single-component luminophores. They designed and synthesized a star-shaped molecule, Ph-3CP, in which three bulky, nonplanar o-carborane–aryl branches generate intrinsic inequivalence under steric congestion. This broken symmetry enables Ph-3CP to exhibit a broad excitation-dependent multicolor emission spanning nearly 175 nm across solution, amorphous, and crystalline states. By varying crystallization solvents, four polymorphs of Ph-3CP were obtained, directly capturing asymmetric conformers and experimentally validating theoretically predicted symmetry-broken structures. Structure–property investigations revealed that Ph-3CP harbors three accessible S1 states—localized excitation (LE) and two distinct charge-transfer states (CT1 and CT2)—with two dominant relaxation pathways (LE↔CT1, LE↔CT2) governing its emission behavior. Time-resolved and ultrafast spectroscopies further unraveled the dynamics of LE→CT2 evolution, with multi-scale lifetimes (~0.25 ns, ~3.88 ns, ~36.02 ns), confirming the single-molecule origin and cross-phase reproducibility of its Ex-de emissions.

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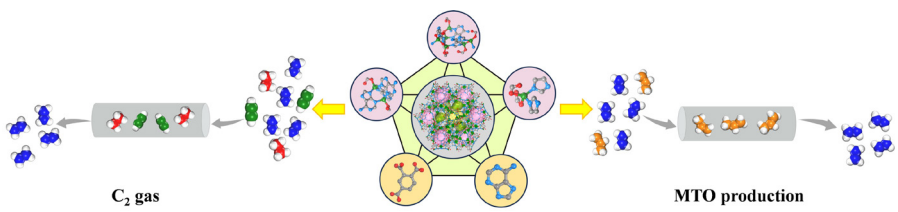
Gas Separation

Strictly Periodic, Adenine-Directed One-Pot Assembly of Multicomponent Metal–Organic Framework: Structural Insights and Ethylene Purification

*Ya-Nan Ma, Teng-Long Liu, Wei-Hong Zhang, Cheng-Hang He, and Dong-Xu Xue**

腺嘌呤导向一锅法组装严格周期性多组分金属有机骨架：结构洞悉与乙烯纯化

Ya-Nan Ma, Teng-Long Liu, Wei-Hong Zhang, Cheng-Hang He, and Dong-Xu Xue*. Angew. Chem. Int. Ed. 2025, ASAP.
DOI: https://doi.org/10.1002/anie.202513208



追求具有卓越气体吸附与分离性能的先进吸附剂，是一个极具前景却又充满挑战的研究前沿。尽管文献中已报道了多种五基元多组分金属有机骨架（MOF），但通过两种不同有机配体与三种金属簇协同整合构建的五基元 MOF 仍极为罕见。

在这里，通过 $Zn(OAc)_2{\cdot}2H_2O$ 与腺嘌呤、1,2,4- 苯三甲酸酐通过溶剂热反应，制备出一种新型 MOF 材料 Quin-Zn-Ad-BTC。单晶 X 射线衍射分析表明，该材料包含三种独特的锌基结构单元：单核 $[ZnN_2(O_2C{-})_2]$、双核 $[Zn_2(Ad)_3(O_2C{-})_2]$ 和六核 $[Zn_6N_3(\mu\text{-}H_2O)_3(Ad)_3(O_2C{-})_6]$。这些单元组装形成了一种新型五元 MOF 结构，成为目前罕见的由双配体和三金属簇构建的 MOF 材料。其结构中含有三个相互连通的笼状空腔，内部富含未配位的羧酸氧原子与沃森 – 克里克位点。

通过甲醇多次交换以及真空加热的条件，该 MOF 得到了成功活化。其中孔体积为 0.50 $cm^3\ g^{-1}$，质量比表面积达到 1220 $m^2\ g^{-1}$，在 298 K，1 bar 条件下，对 C_2H_2 和 C_2H_6 的吸附量始终高于 C_2H_4。Quin-Zn-Ad-BTC 对三种气体的零点吸附焓（Qst）也相对较低，表明该材料具备良好的再生能力。IAST 计算表明，体积比 50/50 的 C_2H_2/C_2H_4、10/90 的 C_2H_6/C_2H_4 的选择性分别为 2.05 和 1.26。最终通过穿透实验证实了 Quin-Zn-Ad-BTC 从三元 C_2 混合物中一步纯化乙烯的独特能力。此

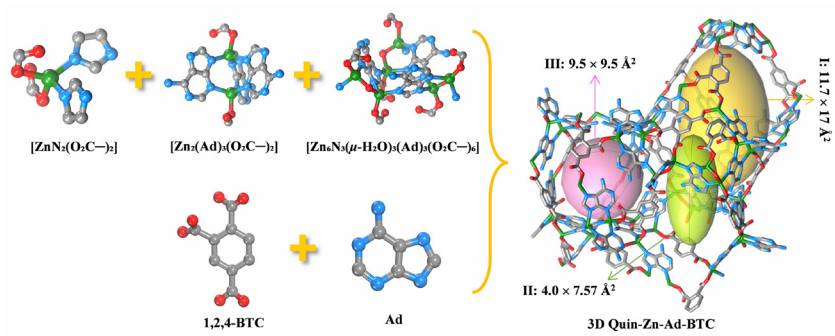


图 1. 五组分 MOF Quin-Zn-Ad-BTC 的结构组装示意图。
Figure 1. Schematic representation showing the assembly of Quin-Zn-Ad-BTC.

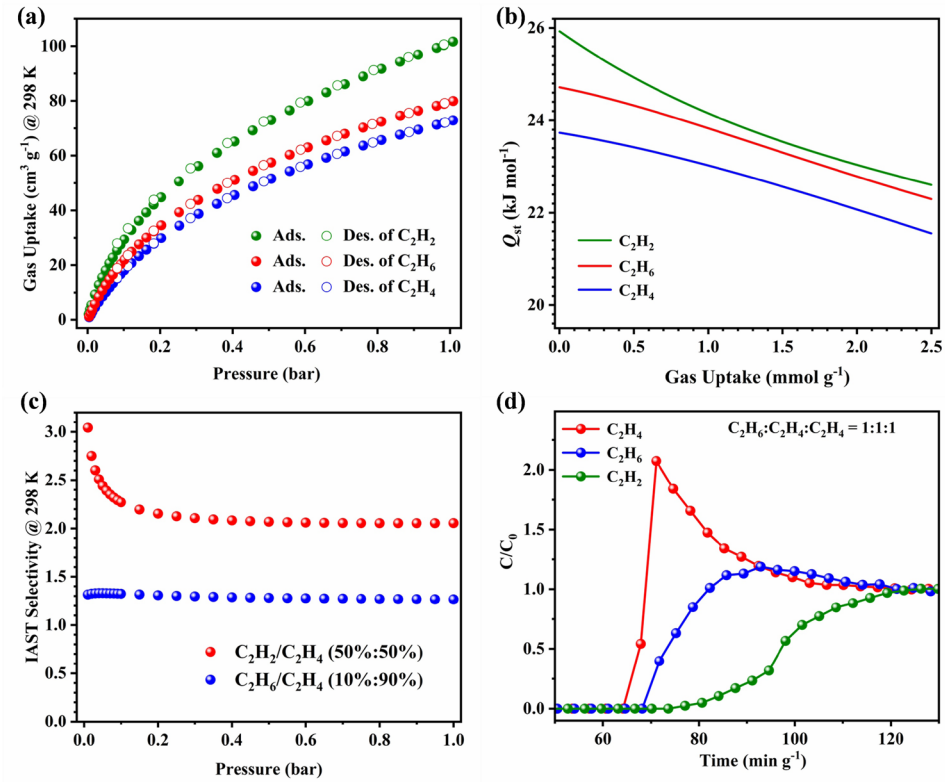


图 2.（a）Quin−Zn−Ad−BTC 在 298 K 温度下对 C_2H_2、C_2H_4 和 C_2H_6 的吸附等温线。（b）三种气体的吸附焓 (Qst)。（c）体积比为 10%/90% 的 C_2H_6/C_2H_4 和 50%/50% 的 C_2H_2/C_2H_4 混合气的 IAST。（d）在 1 mL min^{-1} 流速下，$C_2H_2/C_2H_4/C_2H_6$ 体积比为 1/1/1，三组分混合气的穿透曲线。

Figure 2. (a) C_2H_2, C_2H_4 and C_2H_6 sorption isotherms at 298 K for Quin-Zn-Ad-BTC. (b) Qst of C_2H_2, C_2H_4, and C_2H_6 gases. (c) IAST selectivity for 10%/90% (v/v) of C_2H_6/C_2H_4 and 50%/50% (v/v) of C_2H_2/C_2H_4 mixtures. (d) Experimental column breakthrough curves for C_2H_2/C_2H_4 /C_2H_6 (1/1/1, v/v/v) mixtures under a flow of 1 mL min^{-1}.

外，在 298 K、1 bar 压力条件下测定了 C_2H_4 和 C_3H_6 的吸附等温线，同时进行了 Qst、IAST 选择性计算和模拟 MTO 产物的穿透实验，证明了该材料具有分离 MTO 产物的能力。

总之，本研究通过一锅法溶剂热反应成功合成了一种新型五基元 MOF 材料 Quin−Zn−Ad−BTC。由于其独特的结构特点赋予材料卓越的乙烯纯化性能，能在常压条件下从复杂 C_2 混合物及 MTO 产物中实现乙烯的一步高效分离。该研究不仅验证了五基元 MOF 在轻烃高效分离方面的可行性，而且为组装复杂的多组分 MOF 树立了新的范式。

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全文链接：https://doi.org/10.1002/anie.202513208

The pursuit of advanced adsorbents with exceptional gas adsorption and separation capability represents a highly promising yet challenging research frontier. Several quinary multicomponent metal-organic frameworks (MOFs) have been documented in the literature, however, the construction of quinary MOFs through the synergistic integration of two distinct organic ligands and three different metal clusters remains scarce.

Herein, solvothermal reaction of $Zn(OAc)_2$•$2H_2O$ with adenine and 1,2,4-benzenetricarboxylic anhydride afforded a novel MOF of Quin-Zn-Ad-BTC. SCXRD reveals that Quin-Zn-Ad-BTC incorporates three distinct zinc-based structural units of a mononuclear [$ZnN_2(O_2C{-})_2$], a dinuclear [$Zn_2(Ad)_3(O2C{-})_2$], and a hexanuclear [$Zn_6N_3(\mu\text{-}H_2O)_3(Ad)_3(O_2C{-})_6$], respectively. It features three interconnected cage-like cavities replete

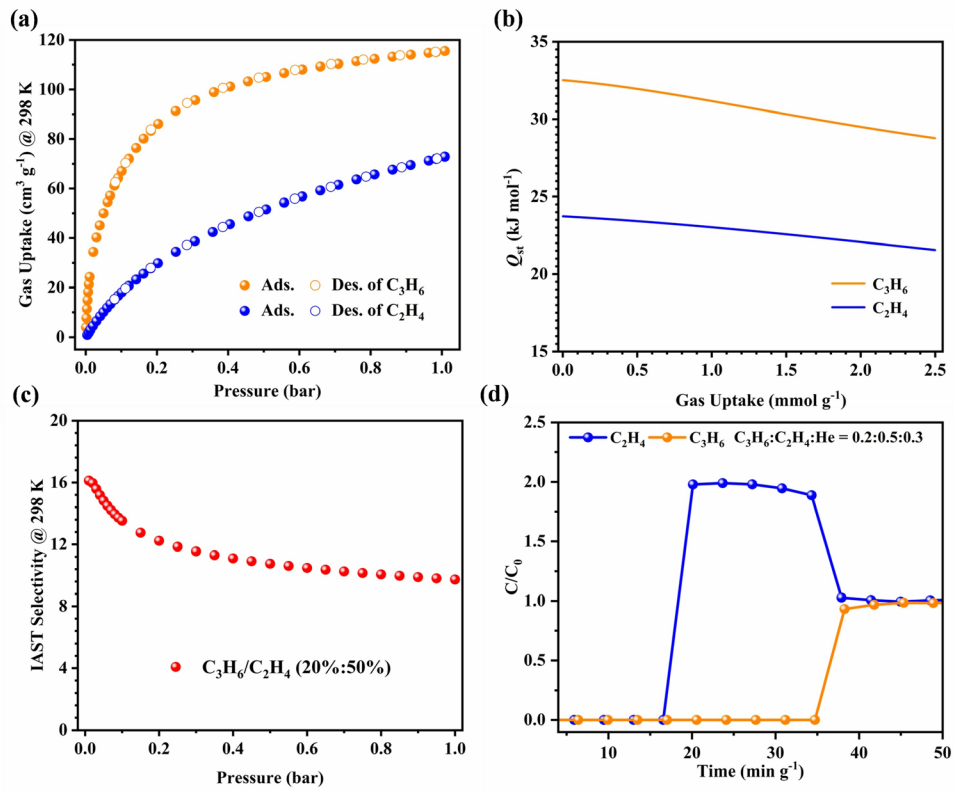

图 3.（a）Quin−Zn−Ad−BTC 在 298 K 温度下对 C_2H_4 和 C_3H_6 的吸附等温线。（b）两种气体的吸附焓 (Qst)。（c）体积比为 20%/50% 的 C3H6/C2H4 混合气的 IAST。（d）在 4 mL min^{-1} 流速下，C_2H_2/C_2H_4/He 体积比为 0.2/0.5/0.3，两组分混合气的穿透曲线。

Figure 3. (a) C_2H_4 and C_3H_6 sorption isotherms at 298 K for Quin-Zn-Ad-BTC. (b) Qst of C_2H_4, and C_3H_6 gases. (c) IAST selectivity for (20%/50%, v/v) of C3H6/C2H4 mixtures. (d) Experimental column breakthrough curves for C_3H_6/C_2H_4/He (0.2/0.5/0.3, v/v/v) mixtures under a flow of 4 mL min^{-1}.

with uncoordinated carboxylate oxygen atoms and Watson─Crick sites.

The MOF was successfully activated through multiple methanol exchanges followed by vacuum heating. It exhibits a pore volume exceeding 0.50 cm^3 g^{-1} and a gravimetric surface area surpassing 1220 m^2 g^{-1}. At 298 K and 1 bar, its adsorption capacities for C2H2 and C2H6 consistently surpass that of C2H4. Quin-Zn-Ad-BTC demonstrates low isosteric heats of adsorption (Qst) for all three gases, indicating excellent regenerability. Ideal Adsorbed Solution Theory (IAST) calculations reveal selectivity values of 2.05 for 50/50 C_2H_2/C_2H_4 and 1.26 for 10/90 C_2H_6/C_2H_4 mixtures. Breakthrough experiments further confirm its unique capability for one-step ethylene purification from ternary C_2 hydrocarbon mixtures. Additionally, C_2H_4 and C_3H_6 adsorption isotherms were measured at 298 K and 1 bar, complemented by Qst analysis and IAST predictions. Simulated breakthrough experiments with methanol-to-olefins (MTO) products demonstrate the material's potential for separating MTO effluent streams.

In this study, we have successfully synthesized a new quinary MOF of Quin-Zn-Ad-BTC through a one-pot solvothermal reaction. Due to its distinctive structural features, the material demonstrates outstanding ethylene purification capability, enabling highly efficient one-step ethylene separation from complex C_2 mixtures and MTO products under ambient pressure conditions. These findings not only validate the feasibility of quinary MOFs for advanced applications in gas adsorption and light hydrocarbon separation, but also establish a new paradigm for assembling complex multicomponent MOFs.

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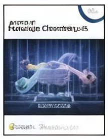
Full Text Link: https://doi.org/10.1002/anie.202513208



From the journal:
Journal of Materials Chemistry A

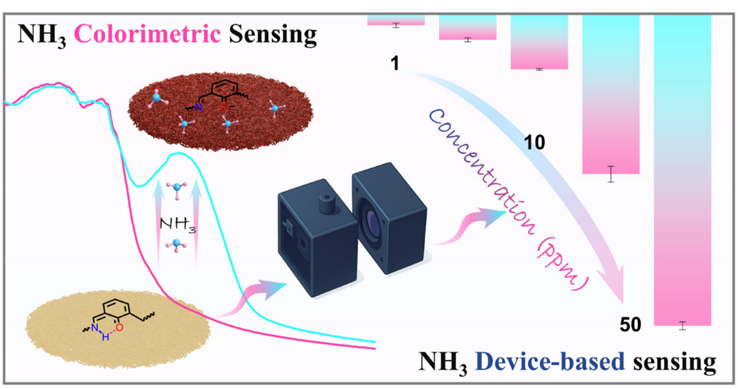
A colorimetric ammonia sensor based on interfacially assembled porous polymer membrane: coupled hydrogen-bonding and electronic structure modulation †

Chock for updatos

Zebiae Oiu, ‡ [a] QianchiXiong, ‡ [a] Heng Zhang, [a] Yue Xiao, [a] Ling Zhang, [a] Ruiiuan Wen, [a] Lioing Ding, [*a] Haonan Peng [*a] and Yu Fang [a]

基于界面组装多孔聚合物膜的比色氨传感器：氢键和电子结构耦合调制

Zebiao Qiu, ‡ Qianchi Xiong, ‡ Heng Zhang, Yue Xiao, Ling Zhang, Ruijuan Wen, Liping Ding*, Haonan Peng* and Yu Fang. J. Mater. Chem. A, 2025,13, 23602-23612. DOI: 10.1039/d5ta03808a



氨气（NH_3）是一种具有高毒性、强腐蚀性和易挥发性的工业气体，被广泛应用于半导体制造、化肥合成及冷却系统等领域。然而，其泄漏不仅会干扰光刻工艺、加速设备腐蚀、造成空气污染，还可能对操作人员的健康带来严重威胁。因此，开发兼具低能耗、快速响应、高选择性及便携集成能力的氨气传感材料与技术，对工业安全监测、洁净室环境稳定控制及环境污染检测具有重要意义。

目前主流的氨气传感平台，如金属氧化物传感器、电化学传感器和荧光探针等，仍普遍存在响应迟缓、能耗过高或信号解析复杂等技术瓶颈，亟需依托新型材料体系实现性能突破。近年来，多孔有机聚合物（porous organic polymers, POPs）因其高度可设计的结构、优异的化学稳定性、大比表面积及丰富的官能团位点，在气体捕获、分离纯化、能量存储和化学传感等领域展现出巨大应用潜力，为氨气传感提供了新的材料选择与发展方向。

本研究采用液–液界面限域动态缩合策略，以2–羟基间苯二甲醛（DFP）与1,3,5–均苯三酰肼（BTH）为构筑单元，在水–有机相界面引发酰腙键缩合反应，成功构筑了一种结构不对称的多孔有机聚合物薄膜（BTH–DFP）。该薄膜表现出良好的自支撑性与整体结构完整性，并在靠近水相一侧呈现出纤维状多孔形貌，有利于增强气体的传质效率。结构表征结果显示，聚合物网络中富含由羟基与腙键形成的分子内氢键作用，在氨气作用下，这些氢键发生断裂，引发材料可见光吸收谱显著红移，导致其在室温条件下快速由浅黄色转变为橙红色，实现可视化比色响应。此外，基于该材料构建的叠层式传感器进一步提升了其实际应用性能，可在日光灯照射下实现对NH_3蒸汽的高选择性、高灵敏度（检测限达 1 ppm）及快速可逆响应，展现出良好的应用前景。

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Ammonia (NH_3), a highly toxic, corrosive, and volatile industrial gas, is extensively employed in semiconductor manufacturing, fertilizer synthesis, and cooling systems. However, accidental leakage can disrupt lithography processes, accelerate equipment corrosion, contribute to air pollution, and pose serious health risks to personnel. Consequently, the development of sensing materials and technologies that feature low energy consumption, rapid response, high selectivity, and facile integration is of great importance for industrial safety monitoring, cleanroom environmental control, and pollution detection.

Conventional NH_3 sensing platforms, including metal oxide sensors, electrochemical sensors, and fluorescent probes, still suffer from critical limitations such as sluggish response, excessive energy consumption, or complex signal interpretation. These challenges highlight the urgent need for breakthroughs enabled by advanced material systems. In this context, porous organic polymers (POPs) have recently emerged as highly promising candidates. Benefiting from their structural tunability, exceptional chemical stability, large specific surface area, and abundant functional sites, POPs have demonstrated significant potential in gas capture, separation, energy storage, and chemical sensing, offering new opportunities for next-generation ammonia detection technologies.

In this study, a structurally asymmetric porous organic polymer film (BTH–DFP) was fabricated via a domain-confined dynamic condensation reaction at a liquid–liquid interface. The film was constructed from 2-hydroxyisophthalaldehyde (DFP) and 1,3,5-benzenetricarbohydrazide (BTH), which underwent acylhydrazone linkage formation at the aqueous–organic phase boundary. The resulting film exhibited excellent self-supporting characteristics and structural integrity. Notably, the side of the film adjacent to the aqueous phase displayed a fibrous porous morphology that enhanced mass transfer efficiency. Structural characterization revealed that the polymer network is rich in intramolecular hydrogen bonds formed between hydroxyl and hydrazone moieties. Upon exposure to NH3 vapor, these hydrogen bonds are disrupted, inducing a pronounced redshift in visible light absorption and causing a rapid color transition from pale yellow to orange-red at room temperature. Furthermore, a stacked sensor architecture based on this film enables highly selective, highly sensitive (limit of detection down to 0.1 ppm), and rapidly reversible detection of NH_3 vapor under fluorescent lighting, demonstrating its strong potential for practical deployment in portable colorimetric sensing systems.

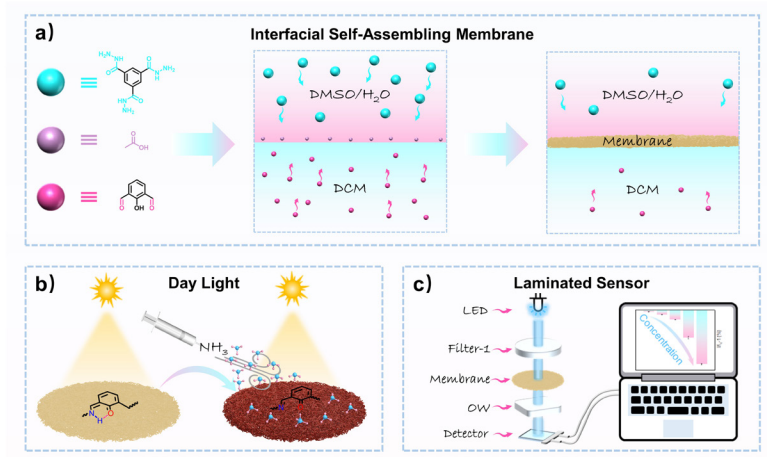

图 1.（a）基于液－液界面限域动态缩合策略制备纳米薄膜的流程示意图；（b）比色传感示意图；（c）薄膜叠层传感器示意图。

Figure 1. (a) Schematic illustration of the fabrication process of nanofilms via a liquid–liquid interfacial confined dynamic condensation strategy. (b) schematic representation of the colorimetric sensing mechanism. (c) schematic diagram of the multilayer film-based sensor.

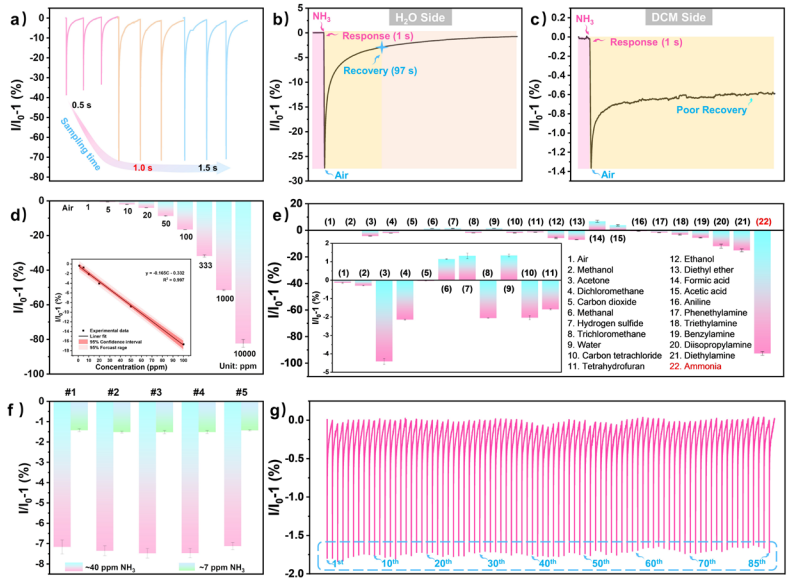

图 2. 基于叠层式薄膜传感器平台的传感测试结果分析。

Figure 2. Sensing performance analysis of the laminated sensor platform.

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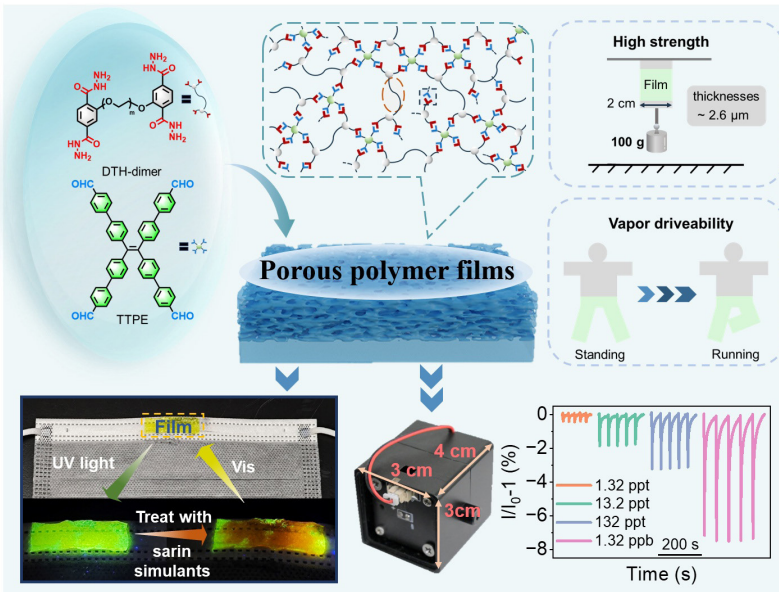
Ultrathin adaptive fluorescent films with high mechanical strength and multi-stimuli responsiveness

Ling Zhang [1], Xingmao Chang [2,*], Zebiao Qiu [1], Ruijuan Wen [1], Zhongrun Kang [1], Chenxi Zhang [1], Qianhua Liu [1], Xuepeng Zhang [1], Haonan Peng [1,*], Yu Fang [1]

兼具高机械强度与多刺激响应性的超薄自适应荧光薄膜

Ling Zhang, Xingmao Chang*, Zebiao Qiu, Ruijuan Wen, Zhongrun Kang, Chenxi Zhang, Qianhua Liu, Xuepeng Zhang, Haonan Peng*, and Yu Fang. Sci. China Chem. 2025. DOI: 10.1007/s11426-025-2816-3



柔性功能材料在便携电子、传感与环境监测等领域具有广泛应用，但同时实现高机械强度、优良柔韧性和多重刺激响应性仍面临挑战。传统的有机－无机复合或聚合物掺杂方法往往存在性能权衡问题。相比之下，气－液界面化学法因其可规模化构筑厚度可控、结构均一的薄膜而备受关注。通过在体系中引入动态共价键，不仅能够赋予薄膜可逆响应和环境适应性，还能提升结构稳定性与功能集成度。

基于湿润空气/二甲基亚砜界面动态共价自组装策略，本研究将聚乙二醇（PEG）链段作为发光砌块的柔性连接臂，以同时提升薄膜的机械强度、柔韧性及对有机蒸汽和湿度的形变响应能力。此外，所得薄膜具备优良的可拉伸性和各向异性形貌，其中

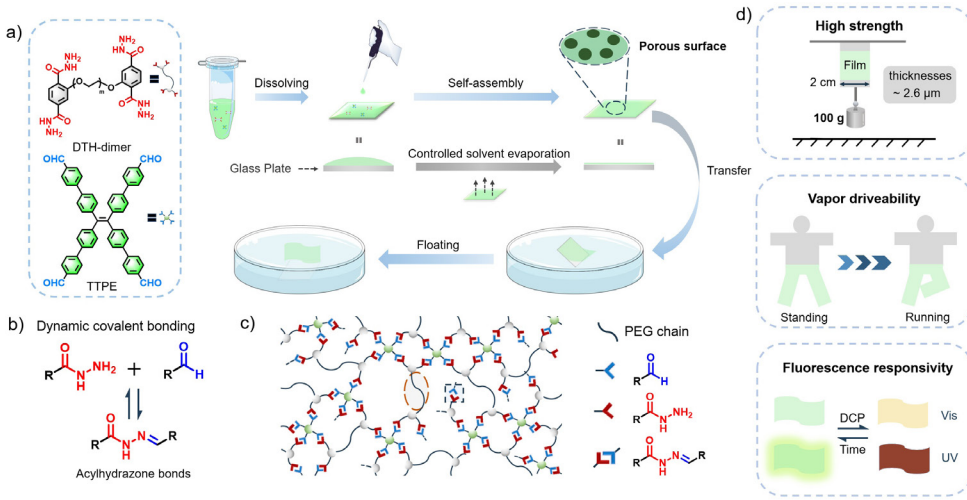


图 1.（a）聚合单体；（b）基于气－液界面限域动态缩合策略制备纳米薄膜的流程示意图；（c）薄膜结构示意图；（d）薄膜基本性质。

Figure 1. (a) Monomers. (b) Schematic diagram of the preparation process of the film based on the gas-liquid interface confined dynamic condensation strategy. (c) Schematic diagram of the film structure. (d) Basic properties of the film.

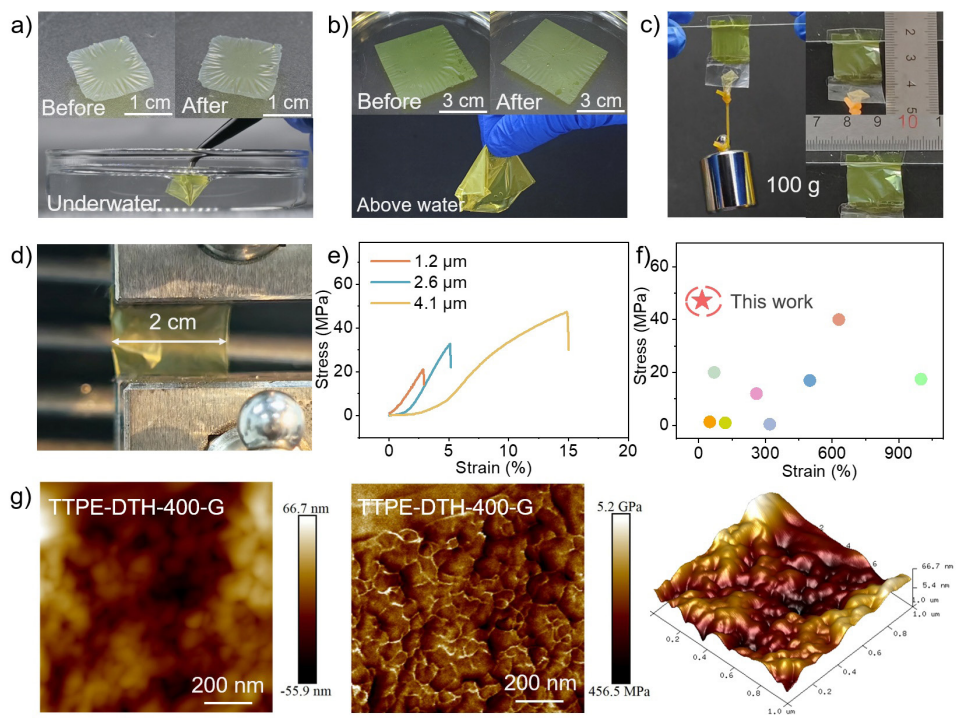


图 2. 薄膜机械性能探究。

Figure 2. Investigation of the film's mechanical properties.

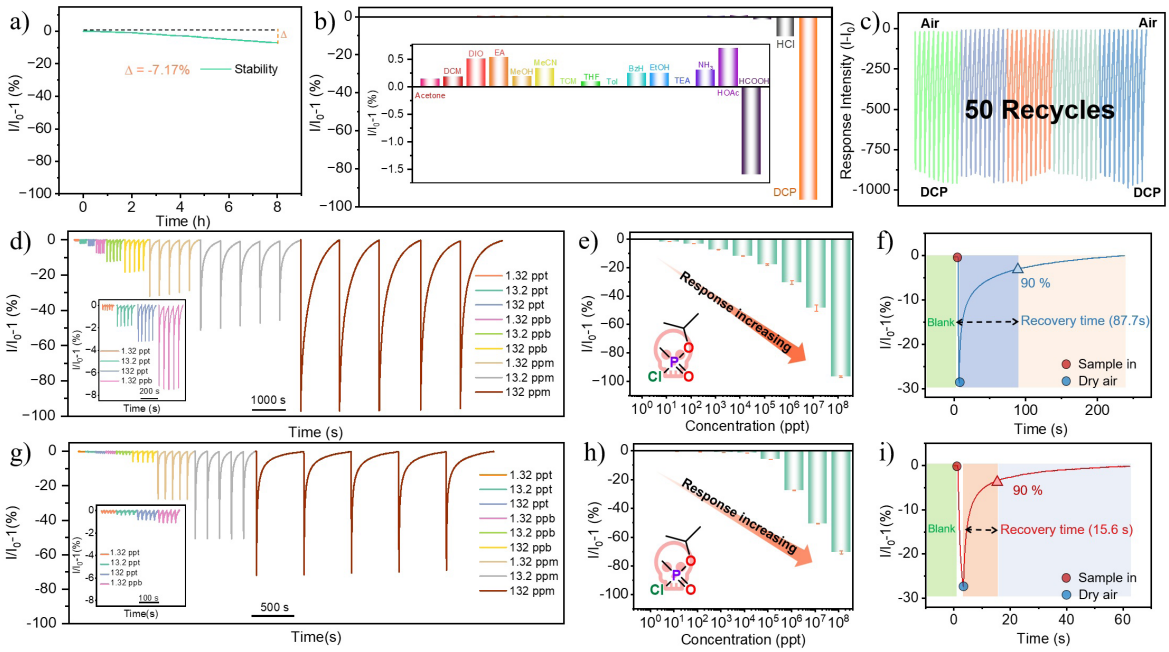


图 3. 基于叠层式薄膜传感器平台的传感测试结果分析。

Figure 3. Analysis of sensing test results based on the stacked film sensor platform.

空气接触面呈现独特的多孔网络结构，大幅增强了对沙林模拟剂二氯丙基磷酸酯（DCP）的荧光检测灵敏度。该材料在力学性能与多重刺激响应性之间实现了兼顾，为高性能功能薄膜的理性设计及其在智能材料与环境监测中的应用提供了新思路。

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Flexible functional materials hold broad potential in portable electronics, sensing, and environmental monitoring. However, the simultaneous realization of high mechanical strength, excellent flexibility, and multi-stimuli responsiveness remains a significant challenge. Conventional organic–inorganic composites or polymer-doping strategies often suffer from inevitable trade-offs in performance. In contrast, gas–liquid interfacial chemistry has attracted increasing attention because it enables the scalable construction of thin films with controllable thickness and uniform structures. By introducing dynamic covalent bonds into the system, the resulting films gain reversible responsiveness and environmental adaptability, along with enhanced structural stability and functional integration.

In this work, we develop a dynamic covalent self-assembly strategy at the humid air/dimethyl sulfoxide interface, employing polyethylene glycol (PEG) segments as flexible linkers to the luminescent building blocks. This design simultaneously improves the mechanical strength, flexibility, and responsiveness of the films to organic vapors and humidity. The as-prepared films exhibit excellent stretchability and anisotropic morphology, with the air-exposed surface forming a distinctive porous network that markedly enhances the fluorescence sensitivity toward the sarin simulant diisopropyl chlorophosphate (DCP). This study demonstrates a rational approach to balancing mechanical performance with multi-stimuli responsiveness, offering new insights into the design of high-performance functional thin films for intelligent materials and environmental monitoring applications.

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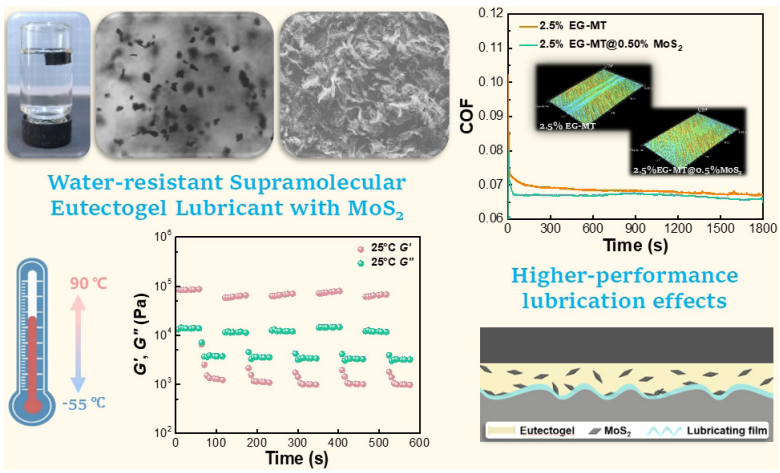
Water-Resistant Supramolecular Eutectogel Lubricant with MoS_2: Thixotropic Behavior and High-Efficiency Lubrication

Maohua Li, Chenxi Guan, Yaolong Zhi, Jindong Li, Shouyi Sun,* Xinchen Zhuang,* Yu Fang, and Junxia Peng*

含 MoS2 的超分子耐水低共熔凝胶润滑剂：触变行为与高效润滑性能

Maohua Li, Chenxi Guan, Yaolong Zhi, Jindong Li, Shouyi Sun,* Xinchen Zhuang,* Yu Fang, and Junxia Peng*. ACS Appl. Mater. Interfaces, 2025, 17, 46197-46207. DOI: 10.1021/acsami.5c09742



开发具有优异流变性能的超分子凝胶润滑剂对于实现高性能润滑至关重要。尽管疏水性低共熔溶剂（HDESs）已展现出作为润滑剂的巨大潜力，但含有 HDESs 的低共熔凝胶润滑剂研究仍属空白。

本研究首次报道了基于 HDES 的耐水超分子低共熔凝胶，其展现出卓越的触变行为和润滑性能。值得注意的是，在所得超分子低共熔凝胶中掺入的 MoS_2 薄片呈现均匀分散且长期稳定无聚集，形成了高度稳定的复合超分子低共熔凝胶体系。研究表明，无论是否添加 MoS_2 薄片，所得超分子低共熔凝胶均表现出优异的耐水特性，在水中浸泡超过 9 个月后性能变化可忽略不计。该低共熔凝胶及其 MoS_2 掺杂体系均具有特征性剪切变稀行为和显著触变性，可实现瞬时的溶胶－凝胶可逆转变。重要的是，这些优越的流变性能在 −10° C条件下仍能保持。这种触变特性确保了摩擦过程中稳定摩擦膜的形成，有效降低摩擦副表面的剪切强度并促进相对滑动。因此，MoS_2 掺杂的超分子低共熔凝胶实现了 0.07 超低摩擦系数。此外，在模拟起落架锁定机构中，此复合凝胶润滑剂在保持优异润滑效果的同时，显著提升了抗磨损性能。本工作为开发绿色高性能超分子凝胶润滑剂提供了重要思路，为解决传统润滑剂的局限性提供了潜在解决方案。

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全文链接：https://doi.org/10.1021/acsami.5c09742

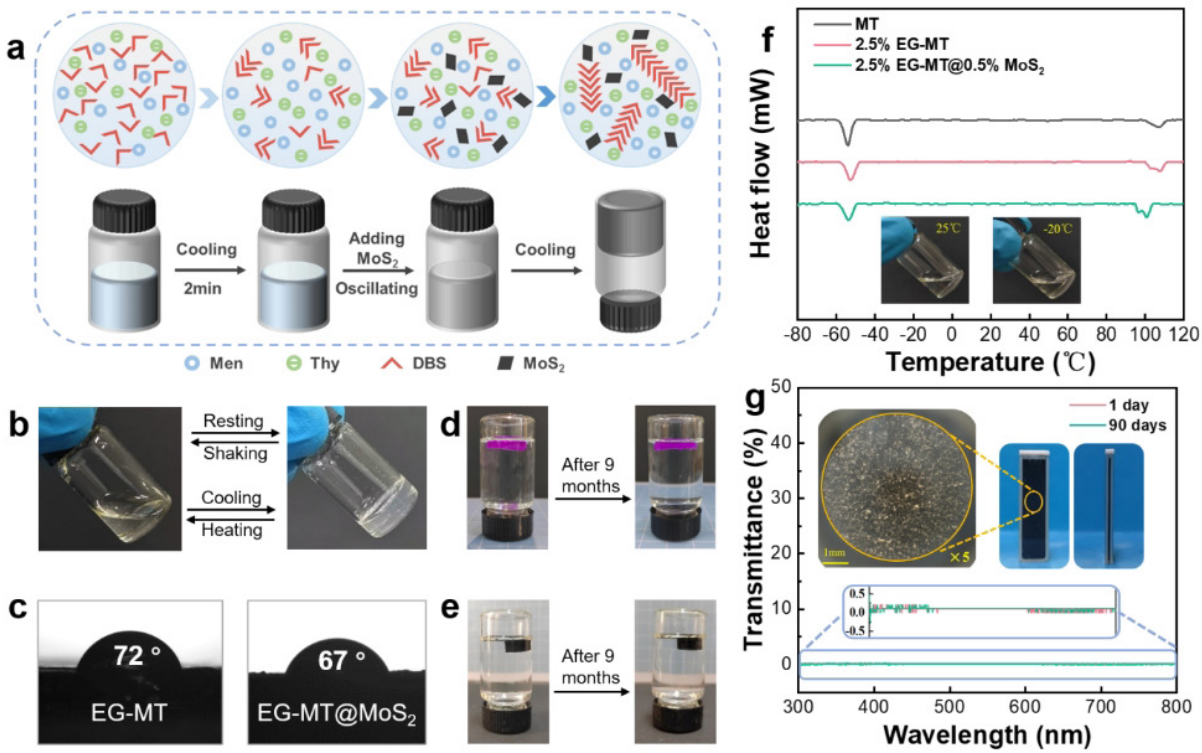

图 1. 超分子低共熔凝胶的制备和稳定性研究。

Figure 1. Schematic diagram of the preparation process and stabilities of supramolecular eutectogels.

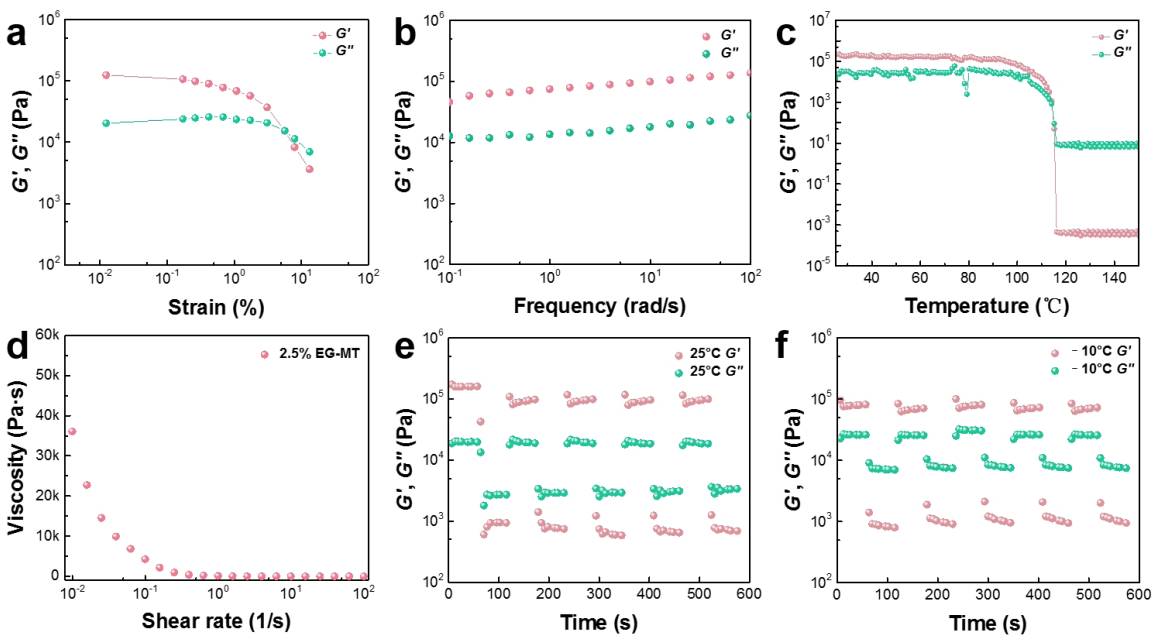

图 2. 超分子低共熔凝胶的流变学性质研究。

Figure 2. Rheological studies of supramolecular eutectogels.

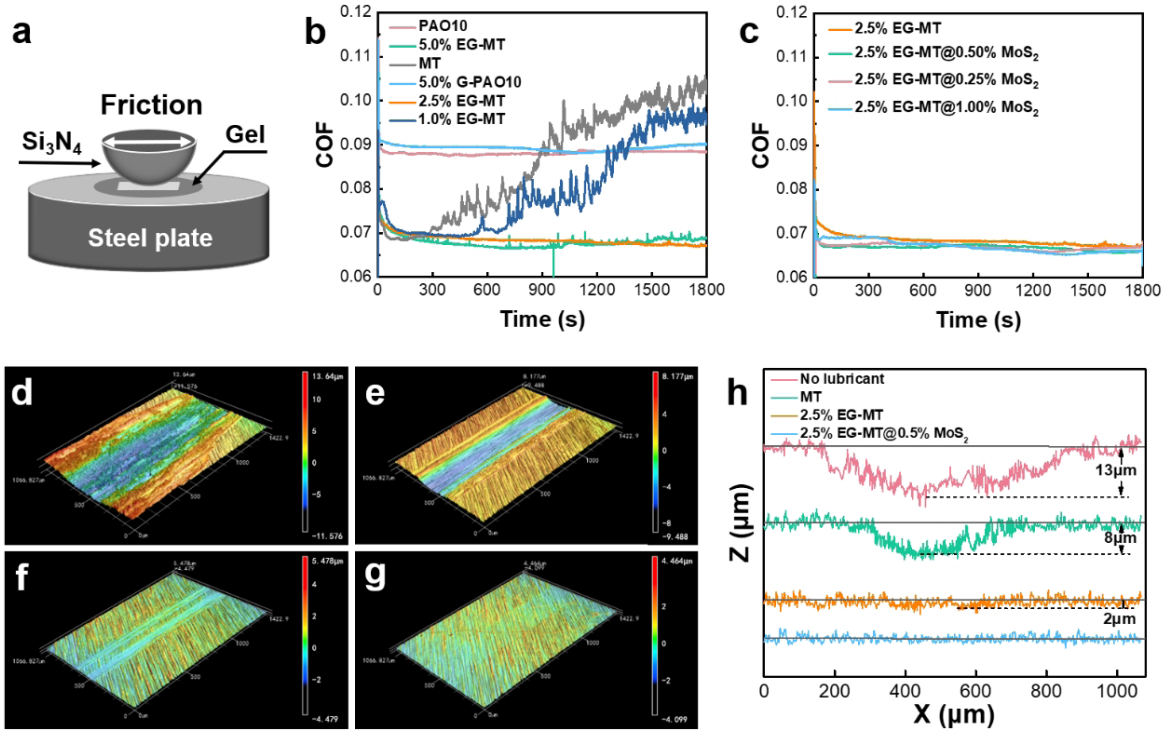

图 3. 超分子低共熔凝胶的摩擦性能研究。

Figure 3. Tribological properties of supramolecular eutectogels.

The development of supramolecular gel lubricants with excellent rheological properties is critical for high-performance lubrication. Although hydrophobic deep eutectic solvents (HDESs) have shown considerable potential as lubricants, eutectogels containing HDESs remains largely unexplored.

Herein, we report the first water-resistant supramolecular eutectogel based on HDES, exhibiting outstanding thixotropic behavior and lubrication performance. Notably, MoS_2 flakes incorporated within the obtained supramolecular eutectogel exhibit uniform dispersion and long-term stability without aggregation, yielding a highly stable composite supramolecular eutectogel. As prepared supramolecular eutectogels without and with MoS_2 flakes display excellent water-resistant property, showing negligible changes after being immersed in water for more than 9 months. Both the eutectogel and its MoS_2-doped counterpart exhibit characteristic shear-thinning behavior and remarkable thixotropy, with instant and reversible sol-gel transitions. Importantly, these superior rheological properties persist at −10 °C. These thixotropic properties ensure the formation of a stable tribo-film throughout the friction process, effectively reducing the shear strength friction-pair surfaces and promoting relative sliding. As a result, the MoS_2-doped eutectogel achieves a low coefficient of friction (COF), with an average value of 0.07. Moreover, the MoS2-doped supramolecular gel lubricant significantly enhances anti-wear performance while sustaining excellent lubrication effects in a simulated locking mechanism of landing gear. This work provides valuable insights for developing green and higher-performance supramolecular gel lubricants, offering potential solutions to the limitations of conventional lubricants.

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Full Text Link: https://doi.org/10.1021/acsami.5c09742

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AI辅助开启化学的新篇章
——人工智能在化学领域的应用与发展综述

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AI 辅助开启化学的新篇章——人工智能在化学领域的应用与发展综述

刘怡帆 , 彭浩南 . AI 辅助开启化学的新篇章——人工智能在化学领域的应用与发展综述 [J]. 大学化学 , 2025, 40(7): 189-199.

人工智能（Artificial Intelligence，AI）凭借强大的数据分析与模式识别能力，正迅速成为推动化学研究和教育模式变革的重要引擎。近年来，随着计算能力与数据存储技术的进步，AI 已在分子合成、材料设计、药物研发、环境监测与绿色化学等多个领域展现出革命性潜力，不仅显著提升了研究效率与创新速度，还推动了实验室自动化和化学教育智慧化的发展。

近日，陕西师范大学彭浩南教授在《大学化学》发表文章，系统梳理了 AI 在化学领域的典型应用与前沿进展。文章涵盖了 AI 在合成化学与材料科学中的新材料筛选与性能预测、在药物发现与设计合成中的分子活性预测与逆合成分析、在环境化学与绿色化学中的污染物行为模拟与新能源材料开发，以及在化学教育中的个性化教学与智慧课堂建设等方面的成果。作者还介绍了 AI 驱动的自动化化学实验室和机器人化学家的最新实践案例，展示了 AI 赋能化学从理论计算到自主实验的全流程能力，并提出了促进跨学科合作、建立高质量数据集、推动 AI 课程建设及伦理规范的重要建议，为 AI 与化学的深度融合提供了清晰的发展路径。

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全文链接：https://www.dxhx.pku.edu.cn/CN/10.12461/PKU.DXHX202405182

Artificial intelligence (AI), with its powerful capabilities in data analysis and pattern recognition, is rapidly becoming a driving force in transforming chemical research and education. In recent years, advances in computational power and data storage have enabled AI to demonstrate revolutionary potential across diverse areas such as molecular synthesis, materials design, drug development, environmental monitoring, and green chemistry. AI not only significantly improves research efficiency and innovation speed but also advances laboratory automation and the modernization of chemical education.

Recently, Professor Haonan Peng's team at Shaanxi Normal University published a comprehensive review in University Chemistry, systematically summarizing the representative applications and cutting-edge developments of AI in chemistry. The article covers AI-enabled breakthroughs in synthetic chemistry and materials science—such as new material screening and performance prediction—as well as in drug discovery and design, including molecular activity prediction and retrosynthetic analysis. It also highlights AI applications in environmental and green chemistry, including pollutant behavior simulation and the development of new energy materials, and in chemical education, such as personalized learning and smart classrooms. In addition, the authors introduce the latest practical cases of AI-driven automated chemical laboratories and robotic chemists, showcasing AI's end-to-end capabilities from theoretical computation to autonomous experimentation. The review concludes with strategic recommendations—such as promoting interdisciplinary collaboration, building high-quality shared datasets, integrating AI-focused courses, and establishing ethical guidelines—to provide a clear roadmap for the deep integration of AI and chemistry.

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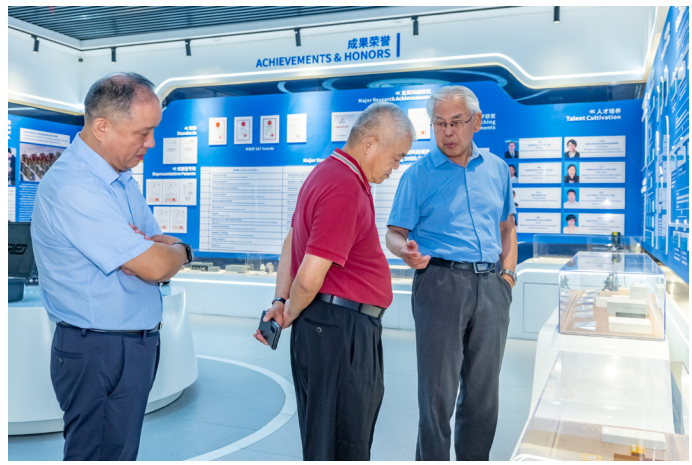
SCCE Class ’95 alumni visitors received



2025 年 8 月 20 日，陕西山利科技发展有限责任公司张勇敢总经理一行四人到访陕西师范大学新概念传感器与分子材料研究院，并与房喻院士进行了座谈交流。

房喻院士带领来宾参观了综合展厅，介绍了研究院的重点项目与科研成果。张勇敢介绍了陕西山利科技在电磁计算与频谱感知等领域的主要业务和发展情况。随后，双方围绕潜在合作方向进行了探讨与交流。

研究院副院长杨小刚、研发工程师何怡楠、罗艳彦和马剑飞参加了座谈。

On August 20, 2025, general manager Zhang Yonggan and three of his associates from Shaanxi Sunny Technology Development Co., Ltd. visited the Institute of New Concept Sensors and Molecular Materials at Shaanxi Normal University and had a discussion with Prof. Fang Yu.

Fang Yu led the guests to visit the comprehensive exhibition hall and introduced the key projects and research achievements of the institute. Zhang Yonggan introduced the main business and development of Shaanxi Sunny Technology in the fields of electromagnetic computing and spectrum sensing. Subsequently, the two sides discussed and exchanged views on potential directions for cooperation.

INCSMM vice dean Yang Xiaogang, R&D engineers He Yinan, Luo Yanyan and Ma Jianfei attended the meeting.

俄罗斯伊万诺沃国立化工大学与科学院克里斯托夫溶液化学研究所来访

Ivanovo State University of Chemistry and Technology and Krestov Institute of Solution Chemistry of RAS guests received

2025 年 8 月 25 日上午，俄罗斯伊万诺沃国立化工大学校长 Natalya Gordina 教授和 Tatyana R. Usacheva 教授，俄罗斯科学院克里斯托夫溶液化学研究所 Nugzar Zhoraevich Mamardashvili 教授和 Sergey Aleksandrovich Syrbu 教授应邀到访新概念传感器与分子材料研究院进行学术交流与座谈，共商合作。

首先，副院长丁立平教授带领来宾参观了综合展厅，介绍了研究院的基本情况、发展理念和科研成果。在随后的座谈中，房喻院士、丁立平教授、刘凯强教授、彭浩南教授、刘太宏副教授与俄罗斯来宾一起回顾了之前的友好访问和学术交流，商讨了未来的学术交流与合作，达成了以荧光传感为起点带动其他领域双边合作的一致意见。

On August 25, 2025, Prof. Natalya Gordina, president of Ivanovo State University of Chemistry and Technology, and ISUCT Prof. Tatyana R. Usacheva, along with Prof. Nugzar Zhoraevich Mamardashvili and Prof. Sergey Aleksandrovich Syrbu from the G.A. Krestov Institute of Solution Chemistry of the Russian Academy of Sciences,

were invited to visit the Institute of New Concept Sensors and Molecular Materials or academic exchange and discussions to explore collaborative opportunities.

First, vice dean Prof. Ding Liping led the guests on a tour of the exhibition room, introducing the institute's basic profile, development philosophy, and research achievements. During the ensuing meeting, Prof. Fang Yu, Prof. Ding Liping, Prof. Liu Kaiqiang, Prof. Peng Haonan and Assoc. Prof. Liu Taihong reviewed previous friendly visit and academic exchanges and discussed future academic collaboration with Russian guests, and they reached a consensus to initiate bilateral cooperation in other fields starting with fluorescence sensing.

宁夏回族自治区教育厅来访调研

Ningxia Hui Autonomous Region Education Department guests received

2025 年 8 月 27 日上午，宁夏回族自治区教育工委书记，教育厅党组书记、厅长周庆华书记一行在陕西师范大学副校长董治宝和校长助理袁一芳陪同下到访新概念传感器与分子材料研究院，调研物理化学国家级教学团队。

研究院刘静教授带领客人参观了研究院展厅，介绍了研究院的基本情况、重点项目、科研成果及教学和学生培养经验。

宁夏回族自治区教育工委副书记黄子平、教育厅办公室、发展规划处、职业教育与成人教育处、高等教育处、教师工作处等单位负责人，陕西省政府学位委员会秘书长朱晓冬及陕西省教育厅科技处相关人员陪同来访。

On August 27, 2025, Mr. Zhou Qinghua, secretary of the Education Work Committee of the Ningxia Hui Autonomous Region and Party Group secretary and director of the Department of Education, accompanied by Shaanxi Normal University vice president Dong Zhibao and assistant president Yuan Yifang, visited the Institute of New Concept Sensors and Molecular Materials

at Shaanxi Normal University, for a survey of its National Teaching Team for Physical Chemistry.

INCSMM Prof. Liu Jing led the guests on a tour of the institute's exhibition room, introducing the basic situation, key projects, research achievements, as well as teaching and student cultivation experiences of the institute.

Ningxia Hui Autonomous Region Education Work Committee deputy secretary Huang Ziping, and the heads of the Administrative Office, Development Planning Department, Vocational Education and Adult Education Department, Higher Education Department, and Teacher Work Department of Ningxia Education Department, as well as Shaanxi Provincial Government Academic Degrees Committee secretary-general Zhu Xiaodong, and officials from the Science and Technology Department of the Shaanxi Provincial Department of Education accompanied the visit.

榆林高新技术产业开发区一行来访

Yulin High-tech Industrial Development Zone guests received

2025 年 8 月 29 日，榆林高新技术产业开发区党工委书记、管委会主任张军、科技创新局局长魏伟一行到访陕西师范大学新概念传感器与分子材料研究院。

杨小刚副院长带领来宾参观了综合展厅，介绍了研究院的基本情况、发展理念、科研方向、技术优势、研究成果及战略布局，随后房喻院士与张军、魏伟一行进行了座谈交流。

On August 29, 2025, Yulin High-tech Industrial Development Zone Party Work Committee secretary and Administrative Committee director Zhang Jun, and Science and Technology Innovation Bureau director Wei Wei, visited the Institute of New Concept Sensors and Molecular Materials at Shaanxi Normal University.

INCSMM vice dean Yang Xiaogang led the guests to visit the exhibition room and introduced the basic situation, development philosophy, research direction, technical advantages, research achievements and strategic layout of the institute. Subsequently, Prof. Fang Yu met with Zhang Jun and Wei Wei for discussion and exchange.

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