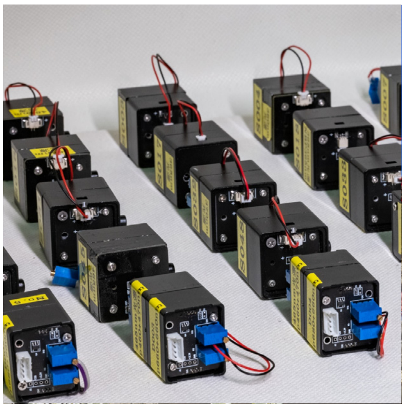
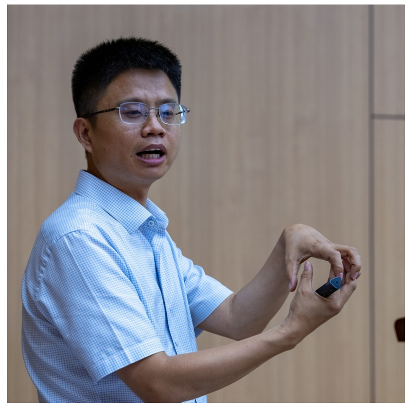
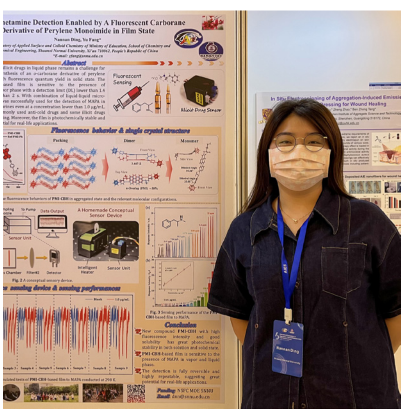
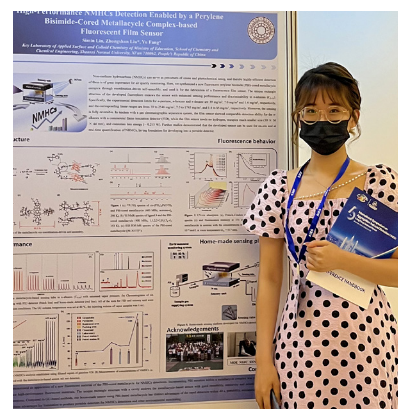
光子鼻与分子材料团队简报

Newsletter of Photonic Nose and Molecular Materials Group

8 / 2022



房喻院士参加 2022 年中国科学院化学部学术年会

Fang Yu attends 2022 CAS Chemistry Dept Conference

8 月 16 日至 19 日，房喻院士受邀参加了在吉林省长春市举办的 2022 年中国科学院化学部学术年会暨“科学与中国”20 周年院士进吉林活动，并作了题为“Adlayer 结构创新与薄膜荧光传感器”的报告。

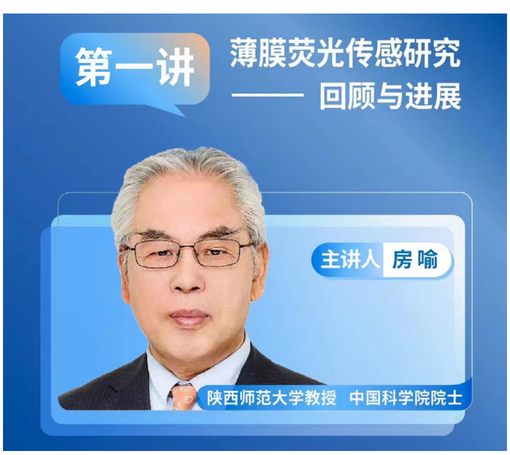
房喻在报告中介绍了涂层结构创新在薄膜荧光传感器研制中的重要作用，并在此基础上对薄膜荧光传感器的发展前景和面临的主要挑战进行了展望。

From August 16 to 19, Prof. Fang Yu was invited to attend the 2022 Annual Conference of Chinese Academy of Sciences' Department of Chemistry and participated in the “CAS Academicians visiting Jilin” themed 20th anniversary of “Science and China” activities in Changchun, Jilin province.

At the conference, Fang presented a report titled “Adlayer Structural Innovation and Film Fluorescence Sensors”, speaking about the important role of coating structure innovation in the development of film fluorescent sensors, as well as the development prospects and main challenges of film fluorescent sensors.

房喻院士做客系列讲座开讲“薄膜荧光传感研究”

Fang Yu speaks on film fluorescence sensing research at lecture series



8 月 29 日，房喻院士受苏州大学迟力峰院士邀请做客“表界面智能响应材料与器件系列讲座”，做了题为“薄膜荧光传感研究——回顾与进展”的报告。

此次讲座为系列讲座的第一讲，由迟力峰院士主持，通过腾讯会议在线进行，共 200 多人参加。

房喻院士在报告中介绍了国内外传感器研究历史和现状、分享了团队在薄膜荧光传感器研究中取得的突破与应用转化情况，并进一步以传感器为例强调了创新驱动、多学科合作、市场导向需求牵引的重要性。

On August 29, Prof. Fang Yu, invited by CAS academician Prof. Chi Lifeng of Soochow University, gave a lecture titled “Film Fluorescence Sensing Research: Review and Progress” at the Lecture Series on Interface Intelligent Response Materials and Devices.

Presided over by Prof. Chi Lifeng, the online lecture was the first one in the series, which was participated by more than 200 listeners.

Fang Yu introduced the history and current situation of sensor research at home and abroad, shared the breakthroughs, applications and industrial transformations made by his group in the research of film fluorescent sensors, and used sensors as an example to emphasize the importance of innovation-driven development, multidisciplinary cooperation and market-oriented traction on demand.

团队师生参加中国化学会第三届光功能材料青年学者研讨会

Fang Group attend CCS 3rd Photofunctional Materials Symposium for Young Scholars

8月11至14日，团队丁立平教授、刘静教授、边红涛教授、马佳妮教授、彭浩南教授以及11名研究生参加了在广东省汕头市举办的中国化学会第三届全国光功能材料青年学者研讨会。

五位老师分别作了题为“交互响应性荧光传感体系的构建与区分识别功能”“荧光超分子界面及其在分子识别中的应用”“半导体薄膜界面结构及超快动力学研究”“系列有机功能分子的光化学反应机理研究”和“高发光微环境敏感型荧光化合物的构建策略及应用”的学术报告。

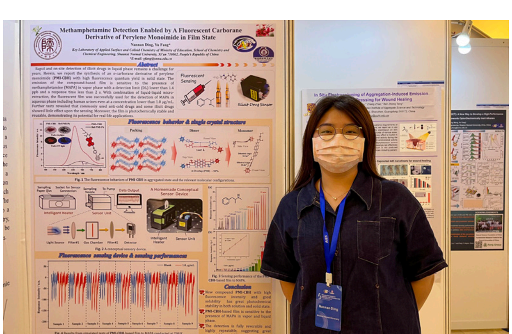
From August 11 to 14, Fang Group teachers Prof. Ding Liping, Prof. Liu Jing, Prof. Bian Hongtao, Prof. Ma Jiani and Prof. Peng Haonan and 11 postgraduate students attended the 3rd Chinese Chemical Society on Photofunctional Materials Symposium for Young Scholars held in

Shantou, Guangdong province.

The five professors presented their works in reports titled Construction and Differentiated Recognition Function of Interactive Responsive Fluorescence Sensing System, Fluorescent Supramolecular Interfaces and Their Applications in Molecular Recognition, Study on the Interface Structure and Ultrafast Dynamics of Semiconductor Films, Study on Photochemical Reaction Mechanism of a Series of Organic Functional Molecules and Construction Strategies and Applications of Highly Luminous Microenvironmentally Sensitive Fluorescent Compounds.

团队研究生参加第五届聚集诱导发光国际研讨会

Fang Group attend fifth AIE Symposium



8月12至14日，团队华春霞博士、王朝龙博士，以及研究生丁南南同学和林思敏同学参加了在广东省深圳市举办的“第五届聚集诱导发光国际研讨会暨翔龙鸣凤科学论坛”，并分别作了墙报展讲。

王朝龙博士和丁南南同学获得了最佳墙报奖。会议结束后，他们还参观了团队技术成果转移孵化的深圳砺剑防卫技术有限公司，在团队毕业生崔红、王莉等公司员工的

带领下，了解了实验室研究成果在高科技技术企业中的应用。

From August 12 to14, Fang Group postdoctoral researchers Dr. Hua Chunxia and Dr. Wang Zhaolong and graduate students Ding Nannan and Lin Simin attended the fifth International Symposium on Aggregation Induced Emission and Long Feng Science Forum held in Shenzhen, Guangdong province and presented their posters.

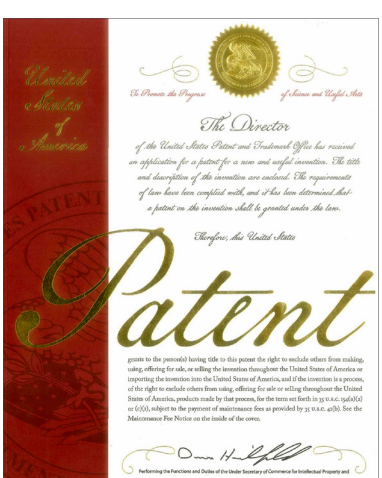
Wang Zhaolong and Ding Nanan won the Best Poster Award. After the event, they visited Shenzhen SRED Security and Surveillance Technology Co., Ltd., a partner transferee of Fang Group’s research findings, and led on a guided tour by SRED technicians and Fang Group alumni Cui Hong and Wang Li.

团队叠层结构荧光传感器获美国专利证书

Fang Group-developed laminated fluorescent sensor granted U.S. patent

8 月 15 日，光子鼻与分子材料团队收到美国专利局签发的证书，房喻院士和文瑞娟研发的一种叠层结构荧光传感器获美国专利，专利证书号为 11255787，专利授权日期为 2022 年 2 月 22 日。

此叠层结构荧光传感器之前已于 2017 年取得中国实用新型专利证书，包括能够密封的传感器外壳和嵌装在传感器外壳中的光学传感系统，体积小，易于阵列化实现同时检测两种或两种以上的被测物，信噪比高，能用于快速检测包括但不限于爆炸物、毒品等微痕量化学品，对非被测物质与被测物质检测时的信号响应可区分度明显，检测高效、稳定、准确。



On August 15, the Photonic Nose and Molecular Materials Group received a certificate issued by the U.S. Patent Office, notifying that a laminated fluorescent sensor comprising a sealable sensor housing and an optical sensing system developed by Prof. Fang Yu and Wen Ruijuan as the inventors has been granted a U.S. patent with a patent certificate number of 11255787 on February 22, 2022.

Previously granted a Chinese utility model patent in 2017, this compact laminated fluorescent sensor includes a sealable sensor housing and an optical sensing system, can be easily arrayed for simultaneously detecting two or more detected objects, has a high signal-to-noise ratio, is applicable in quick detection of micro-trace chemicals including but not limited to explosives and narcotics, is highly effective, stable and accurate in detection, and has distinctly distinguishable signal responses to objects not being detected and to objects being detected.

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Organic Fluorescence

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Single-Fluorophore-Based Organic Crystals with Distinct Conformers Enabling Wide-Range Excitation-Dependent Emissions

Rongrong Huang, Chao Wang, Davin Tan, Kai Wang, Bo Zou, Yangtao Shao, Taihong Liu, Haonan Peng, Xiaogang Liu,* and Yu Fang**

基于构象调控的晶态单组分激发波长依赖多色发光

激发波长依赖的固态多色发光材料在智能传感、多色显示与信息存储等领域具有广阔的应用空间。在荧光传感领域，这一独特的光物理性质对于构建（基于单一荧光单元的）传感阵列，实现传感器件微型化，提高复杂样品区分检测能力都具有极其重要的意义。目前为止，已报道的基于单一组分的激发波长依赖多色发光主要通过反卡莎分子体系和单体 / 二（多）聚体体系的构建而实现。然而，已发现的反卡莎体系最多只呈现双发射；基态聚集体的形成往往受制于分子间诸多相互作用的限制。因此，发展基于新原理的激发波长依赖分子发光材料无疑对深化激发态过程理解，总结功能分子材料设计方法，拓展功能分子材料应用都具有极其重要的意义。

据此，我们提出了以具有类球体结构特征的邻碳硼烷为吸电子片段构建 D–π–A 分子体系，利用结构中的两个旋转角（α 与 β）的改变赋予分子构象多样性，从而获得具有激发波长依赖特性的多色发光材料的普适性设计策略。

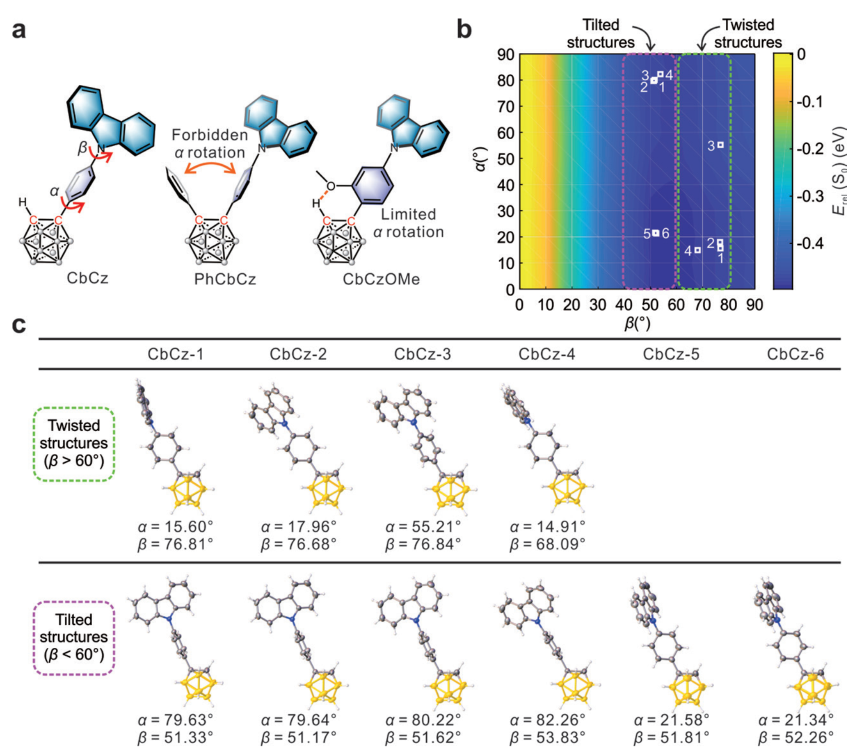

图 1. 目标化合物的化学结构、基态势能面与晶体中的分子构象。
Figure 1. The chemical structures of the target compounds, potential energy surfaces of CbCz in the S0 state, and the molecule structures in the six CbCz crystals.

在该类分子中，引入兼具类球体结构和拉电子特性的邻碳硼烷不仅可调控分子吸收 / 发射能隙，还能确保分子在结晶后仍保持一定的旋转自由度，因此为晶

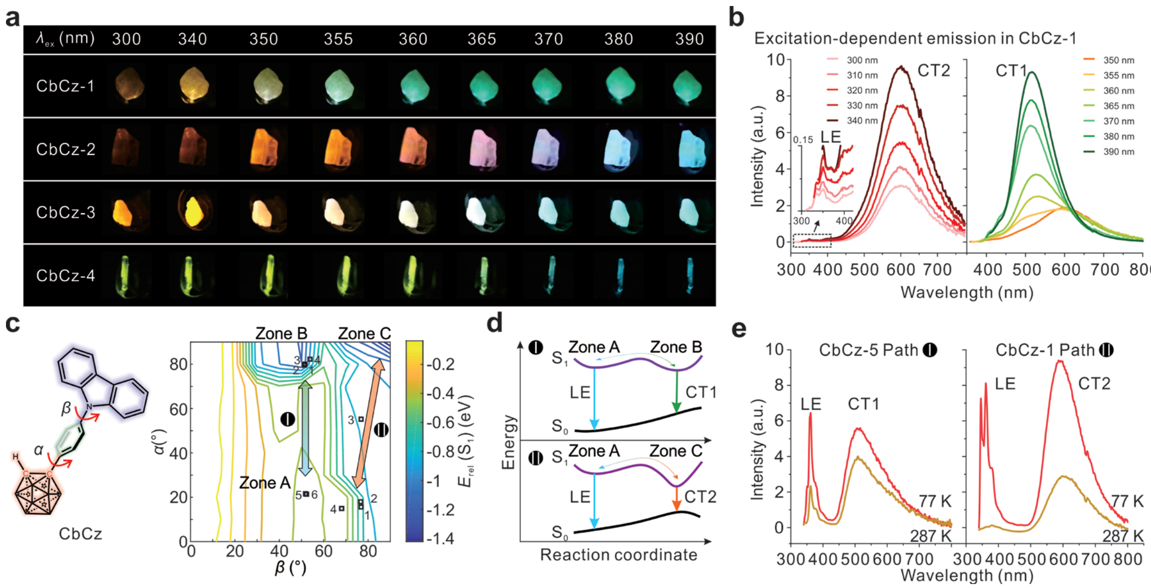

图 2. CbCz 的激发波长依赖性质与激发态弛豫路径。
Figure 2. The excitation-dependent emissions of CbCz and its relaxation pathways in the excited state.

态时分子构象的多样性奠定了基础，也为单组分构象依赖多色发光分子体系的构建提供了依据。基于上述考虑，我们通过系统的理论计算，证实了目标分子 CbCz 在基态时就具有丰富的构象多样性；激发态势能面扫描结果显示 CbCz 存在 Zone A（LE），Zone B（CT1）和 Zone C（CT2）三个发光态。

在理论研究的基础上，我们合成了 CbCz，并得到了六种 CbCz 晶体。结构解析表明不同晶体中，CbCz 以不同构象存在，且差异显著（α：14.91° ~ 82.26°；β：51.17° ~ 76.84°）。根据 β 的不同，作者将上述构象分为 Tilted 与 Twisted 结构。在所得到的六种 CbCz 晶体中，四种呈现出明显的激发波长依赖发光特性：随激发波长的变化，晶体荧光由蓝绿色 / 绿色逐渐变化至橘红色，波长变化长达 230 nm。相关结果可由一个局域激发态（LE）和两个差异较大的分子内电荷转移激发态（CT1 与 CT2）的共存而完美阐释。

具体来讲，CbCz 的 S1 态可经由 Path Ⅰ 和 Path Ⅱ 两种不同路径分别弛豫至 LE，CT1 和 CT2（LE ↔ CT1；LE ↔ CT2）。由于 α 旋转自由度更大，邻碳硼烷的转动导致 Tilted 构象分子在 Zone A 与 Zone B 之间存在平衡 (Path I)；而 Twisted 构象分子则更易实现 Zone A 与 Zone C 之间的平衡 (Path II)。变温荧光光谱证实了这一推测。这种不同构象的共存和转变使得 CbCz 呈现出突出的激发波长依赖多色发光性质。

此外，我们也证明了该策略具有普适性。把供体片段用其他发色团替代后，可进一步丰富材料的发光颜色，并保持其激发波长依赖的多色发光特性。

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Excitation-dependent multicolor luminescent materials in the solid state enable many promising applications, such as smart sensors, full-color display and information storage. In the field of fluorescent sensing, the unique properties of excitation-dependent emissions are also significant to construct single-fluorophore-based miniature sensor array for improved selective sensing of complicated analytes. Single-fluorophore-based excitation-dependent multicolor luminescence has been realized in several materials systems, such as suppressing of Kasha's rule, and monomer/aggregate system. Unfortunately, the development of such single-fluorophore systems is hindered by inherent technical challenges: most luminescent materials typically show only one emission band, according to Kasha's rule, and a few existing examples with excitation-dependent luminescence has only two emissions bands; conformational diversity is significantly constrained in the solid state, especially in the crystalline phase. Accordingly, the development of simple and effective strategies that can greatly enhance the tunability of such single-fluorophore luminescent materials is highly desirable.

In this work, we provided a general strategy to construct D-π-A molecular system using o-carborane as electron-withdrawing group. The designed system possesses two rotary angles (α and β) which would increase degree of freedom could potentially expand the number of emission states and thus enhance the color tunability.

In the molecule design, o-carborane could serve as a steric auxiliary to suppress aggregation-caused quenching (ACQ) and enable aggregation-induced emission (AIE) in the solid state; electron-deficient o-carborane could also induce electronic effects to alter and tune the optical gap and emission efficiency of luminophores.

Based on our hypothesis, we conducted detailed quantum chemical calculations on CbCz to investigate its conformational diversity and multicolor emissions. To this end, we scanned the S0 and S1 potential energy surfaces (PESs) as a function of both dihedral angles α and β along with the two rotatable bonds. The S0 PES exhibits a large and fairly flat area. In this "flat" zone, α extends from 0° to 90°, indicating that the rotation of the o-carborane fragment is almost barrierless. Three local emissive minima can be found on the S1 PES, i.e., Zone A, Zone B, and Zone C.

Next, we synthesized CbCz and obtained six different polymorphs of CbCz. It is noteworthy that there is a large range of α and β angles amongst all the observed different conformations; α ranges from 14.91° to 82.26°, and β from 51.17° to 76.84°. These wide distributions of both α and β contribute to the conformational diversity of CbCz. Conformers in these crystals can be further divided into two groups: tilted structures with β less than 60°, and twisted structures with β larger than this angle. The four crystals of CbCz (CbCz-1 to CbCz-4) all exhibit significant excitation-dependent emissions: as the excitation wavelength increased, the fluorescence color could change from green/cyan to orange-red with a wide wavelength shift of 230 nm. Experimental and calculation results indicate that the co-existence of LE and two distinct intramolecular CT states contribute to the unique photophysical properties.

Specifically speaking, S1 state of CbCz could relax to LE, CT1 and CT2 states from two individual paths (Path I and Path II, LE ↔ CT1; LE ↔ CT2). Owing to the rotational freedom of the spherical o-carborane fragment as a function of α, the first pathway (I) connects Zone A (the LE state) to Zone B (the CT1 state). The twisted structures in these crystals will most likely follow Path II, moving toward Zone C (CT2) on the S1 PES. Temperature-dependent emission spectra also affirmed the results vide supra. Accordingly, these paths collectively explain the three emission states of CbCz monomers in these crystals, and the observed excitation-dependent fluorescence colors in the crystals.

We further show that this molecular platform is generalizable by simply replacing the carbazole moiety with other donor fragments, thus creating a broad range of multicolor luminescent materials.

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ADVANCED FUNCTIONAL MATERIALS

Research Article | Free Access

A Mild-Stimuli-Responsive Fluorescent Molecular System Enables Multilevel Anti-Counterfeiting and Highly Adaptable Temperature Monitoring

Dingfang Hu, Wenjun Xu, Gang Wang, Ke Liu, Zhaolong Wang, Qiyuan Shi, Simin Lin, Zhongshan Liu, Yu Fang

用于多级防伪和高适应性温度监测的温和刺激响应荧光分子体系

智能发光材料能够对光、热、力、有机蒸气等一种或多种外部刺激产生响应，已被广泛应用于加密 / 解密、传感、无墨打印、荧光温度计等领域。其中，荧光颜色可按需调节的特点赋予了智能荧光材料可视化编码及解码的能力。但是这种基于简单的光物理行为设计的防伪标签面临被克隆的风险。因此，为了应对这一挑战，科学家们利用超分子化学、动态褶皱模式、二维矩阵等开发了大量具有高级防伪能力的防伪标签。值得注意的是，编码或解码防伪信息往往需要用到特殊设备或严苛的刺激条件（腐蚀性或有毒化学品、高温等）。正是这种对用户不友好的刺激条件给防伪标签的生产、使用、商品认证等带来了困难。此外，智能发光材料在温度监测方面也独居特色，如可视化、非接触、响应快、抗电磁干扰等，而目前已报道的体系往往存在温度范围不可调节的问题，很难满足宽范围、高灵敏的温度传感监测。

为了解决上述问题，我们首次开发了基于亚胺质子竞争结合的四配位硼分子体系（NI–CBN）。其中，NI–CBN 中的亚氨基团（NH）能够与四丁基氟化铵（TBAF）反应产生一个动态荧光团（NI–CBN–F），该荧光团利用质子在 NH 基团和 F^- 之间的可逆迁移，实现了温和刺激响应荧光分子体系的构建。该体系在溶液态和固态均表现出显著的温和刺激响应性（例如光照、温度、湿度），并伴随快速、易分辨的可见颜色和荧光变化。此外，溶剂组成的微小变化可以使体系的温度敏感范围扩大到 –80 至 60 °C。以上发现，不仅为构建智能发光材料提供了新思路，还成功实现了高级防伪、宽范围高精度的可视化温度监测等应用。

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全文链接：https://doi.org/10.1002/adfm.202207895

Smart luminescent materials with responses to one or more external “triggers”, such as light, heat, mechanical force, and chemical vapors, have gained intense attention in encryption/decryption, sensing, ink-free printing, luminescent thermometers, and others. The feature of adjustable fluorescence color changes on demand endows smart materials with an encoding capacity, as well as an easily decodable property through visualized patterns. However, anti-counterfeiting tags based on simple

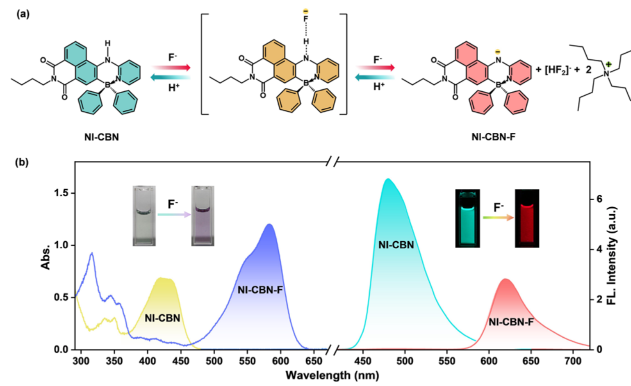

图 1 a) NI−CBN 的质子化 / 去质子化示意图；b) NI−CBN 和 NI−CBN−F 在 THF 中的紫外 – 可见吸收和荧光发射光谱 (λ ex = 365 nm)。插图：在日光和 365 nm 紫外光下的照片 (5.0×10^{-6} mol L^{-1}, 298 K)。

Figure 1. a) Schematic protonation/de-protonation of NI-CBN. b) UV-vis absorption and fluorescence emission spectra (λex = 365 nm) of NI-CBN and NI-CBN-F in THF. Inset: the corresponding photographs under daylight and 365 nm UV light, respectively, (5.0×10^{-6} mol L^{-1}, 298 K).

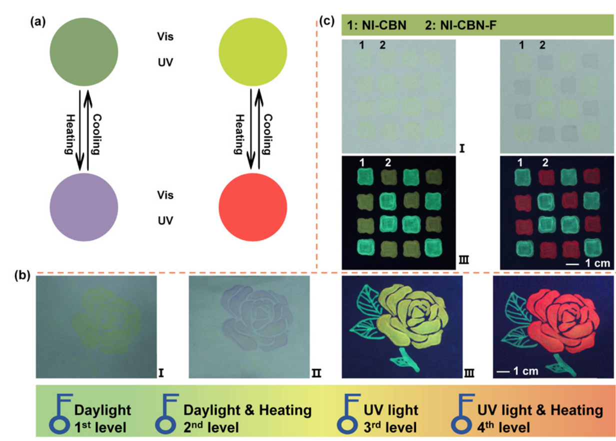

图 2 a) NI−CBN−F 薄膜在外部刺激下的可视化示意图。b) 采用 NI−CBN 和 NI−CBN−F 作为加密墨水的逐级解密过程。c) 多级防伪二维编码。

Figure 2. a) Schematic depiction of color changes of the NI-CBN-F film upon external stimuli. b) Gradual decryption process. The pattern was written using NI-CBN and NI-CBN-F as inks. c) Two-dimensional matrix codes for multilevel anti-counterfeiting.

photophysical behavior have the risk of being cloned. To address the challenge, tunable luminescent materials have been developed to produce anti-counterfeiting tags with high-level security through supramolecular chemistry, dynamic wrinkling pattern, and two-dimensional matrix codes. It should be noted that special devices or harsh stimuli (corrosive or toxic chemicals, high temperature, etc.) are usually needed to encode or decode anti-counterfeiting information in tags. It is the user-unbenign stimulus that will bring difficulties in the production of anti-counterfeiting tags, and in the use for goods authentication. Another representative application of the smart luminescent materials is visualized temperature monitoring. The known systems, however, are suffered from less adjustability owing to unchangeable temperature range.

As a solution to the aforementioned problems, we developed for the first time an imine proton-competitive binding-based four coordinated boron molecular system (NI-CBN). The reaction between the imine group of NI-CBN and the TBAF yields a dynamic fluorophore, NI-CBN-F, which realized the construction of smart luminescent materials via proton migration between the imine group in NI-CBN and the fluoride anion of the salt. The system exhibits remarkable mild-stimuli responsiveness (e.g., light illumination, temperature, humidity) with rapid and sharp changes in color and fluorescence in both solution and solid state. The small change in solvent composition enables the NI-CBN-F system to show adjustable linear range, and realize temperature monitoring from -80 to 60 °C. Our work not only offers new ideas for the construction of smart luminescent materials, but also demonstrates the promise of the mild-stimuli-responsive fluorescent molecular system for advanced anti-counterfeiting, and large-range, high-precision, visualized temperature monitoring.

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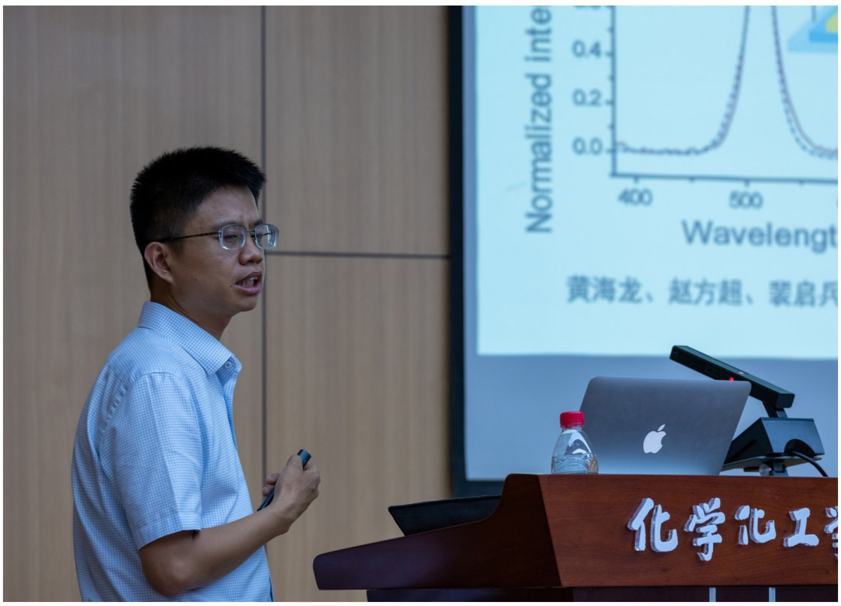
钟海政教授作学术报告并与团队座谈

Prof. Zhong Haizheng invited for report and discussion meeting



8 月 10 日下午，北京理工大学钟海政教授应光子鼻与分子材料团队邀请在致知楼 1668 报告厅作了题为“钙钛矿材料的敏感特性与传感应用研究”的学术报告。报告由边红涛教授主持，团队教师及团队全体博士、硕士研究生聆听报告。

钟海政教授围绕钙钛矿量子点的制备、与水和氧气的作用对自己的科研进展作了介绍，详细讲述了配体工程等策略在提升钙钛矿量子点稳定性中的重要作用，并展示了稳定的钙钛矿量子点在传感方面的应用。

报告结束后，钟海政教授与团队成员进行了座谈。钟海政教授现为美国化学会 J. Phys. Chem. Lett. 杂志执行主编，该杂志为国际上物理化学领域重要期刊，收录于 Nature Index。他介绍了 JPCL 的基本运行情况，针对大家关心的杂志投稿、审稿过程等问题给予了解答，并表示 JPCL 希望通过共同举办学术活动加强与陕西师范大学化学与化工学院的合作，促进学院物理化学学科的发展。

会后钟海政参观了光子鼻分子材料团队产业化平台，化学化工学院院长薛东教授和物理化学教研室主任刘峰毅教授也出席了会议。

On August 10, the Photonic Nose and Molecular Materials Group invited Prof. Zhong Haizheng of Beijing Institute of Technology to present a report titled Study on Sensitive Properties and Sensing Applications of Perovskite Materials at the Lecture Room No. 1668 in Zhizhi Building.

Members and graduate students of the group attended the lecture.

Zhong Haizheng introduced his scientific research progress around the preparation of perovskite quantum dots and their action with water and oxygen, explained the important role of ligand engineering and other strategies in improving the stability of perovskite quantum dots, and presented the applications of stable perovskite quantum dots in sensing.

After the report, Zhong Haizheng and Fang Group members had a discussion meeting. Prof. Zhong is currently the executive editor-in-chief of Phys. Chem. Lett. published by the American Chemical Society, an internationally important journal in the field of physical chemistry included in the Nature Index. He briefed about the basic operation of JPCL and answered questions about the journal's submission and review process. Zhong said that JPCL hoped to strengthen cooperation with the School of Chemistry and Chemical Engineering of Shaanxi Normal University through joint academic activities, so as to promote the development of SCCE's physical chemistry discipline.

After the meeting, Zhong Haizheng visited Fang Group's platform for commercialization of research findings. SCCE Dean Xue Dong and Physical Chemistry Teaching and Research Section director Liu Fengyi also attended the meeting.

洛阳科博思新材料公司一行来访

Meeting held with Luoyang Kebos New Materials visitors

8 月 11 日上午，洛阳科博思新材料科技有限公司常务副院长侯兴军、总工程师魏建国来光子鼻与分子材料研究团队参观访问，并与房喻院士及团队成员进行了座谈。

在带领来访人员参观了陕西师范大学材料性能评价与原型设备研制共享平台之后，房喻院士重点介绍了科研团队在轻质高强交联聚苯乙烯泡沫材料研究领域取得的系列成果和产业转化情况。

在随后的座谈会上，侯兴军副院长介绍了科博思科技有限公司、未来发展规划和发展需求，房喻院士、刘凯强研究员、彭军霞副教授就发展需求与对方进行了深入交流，最后双方在特殊材料研制和转

化方面表达了合作意向。

洛阳科博思新材料科技有限公司系上市公司隆华科技旗下全资子公司，公司业务分布于轨道交通、风力发电、军工安防等领域。

On August 11, executive vice president Hou Xingjun and chief engineer Wei Jianguo of Luoyang Kebos New Materials Technology Co., Ltd. visited the Photonic Nose and Molecular Materials Group at Shaanxi Normal University, and met with CAS academician Fang Yu and his group members.

After guiding the guests in a visit to SNNU's Material Performance Evaluation and Prototype Equipment Development Sharing Platform, Fang Yu briefed them on the series of achievements and industrial transformation of his group's research in the field of lightweight and high-strength cross-linked polystyrene foam materials.

At the meeting, Hou Xingjun briefed about Kobos, its future development plan and development needs. Fang Yu, research fellow Liu Kaiqiang, and associate professor Peng Junxia exchanged ideas with Kobos visitors on their development needs, and the two sides expressed their intention to cooperate in the development and industrial transformation of special materials.

Luoyang Kebosi New Materials Technology Co., Ltd. is a wholly-owned subsidiary of Longhua Technology, a listed company, and its business scope covers rail transit, wind power generation, military and security.

中国兵器工业集团西安应用光学研究所孙峰书记一行来访

COIG Xi'an Institute of Applied Optics's Sun Feng visits to boost cooperation

8 月 19 日上午，中国兵器工业集团西安应用光学研究所孙峰书记一行来到光子鼻与分子材料科研团队，拜访房喻院士并商讨合作事宜。

房喻院士对孙峰书记一行表示了欢迎，介绍了团队的愿景理念和科研历程，概括了团队在基础研究到产业应用方面取得的重要成绩，包括从荧光传感薄膜到高端爆炸物、毒品检测仪的诞生，从试管实验的凝胶化学到凝胶推进剂、凝胶云爆弹、低密度高强度材料等领域的重要拓展，并展望了团队研发的新技术和新材料的推广和应用。

孙峰书记介绍了中国兵器工业集团西安应用光学研究所的基

本情况，对团队取得的成绩表示祝贺，希望能在特殊化学物质检测与高性能材料研发方面与团队开展实质性合作。

On August 19, a delegation led by Mr. Sun Feng, secretary CPC China Ordnance Industries Group Xi’an Institute of Applied Optics Committee visited the Photonic Nose and Molecular Materials Group and discussed cooperation with Prof. Fang Yu.

Fang Yu welcomed Sun Feng and his colleagues and briefed them about his group’s vision and ideals, research progress and major achievements, from basic research to industrial application, evolving from fluorescent sensors to high-end series explosives and narcotics detectors, from tube-tested gel chemistry to gelled propellant, gelled fuel air explosives, high-energy density energetic material, and light-weight high-strength Soft Template-based Polystyrene Foam (STPS), and envisioned the promotion and industrialization of the group’s new technologies and new materials.

Sun Feng briefed about profile of his institute, congratulated on Fang Group’s achievements, and hoped they could carryout substantial cooperation in the detection of special chemical substances and the development of high performance materials.

参会感想

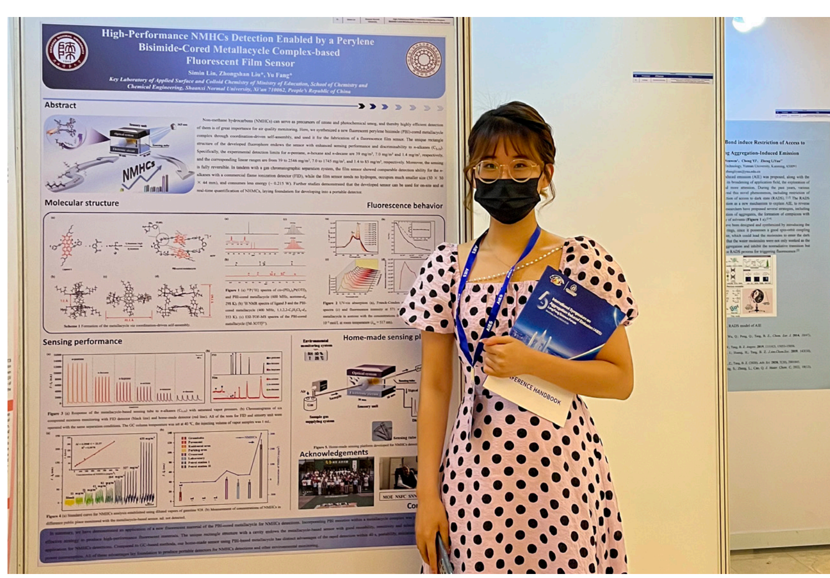
My reflections after attending ymposium

文 / 林思敏 by Lin Simin

这次参会“第五届聚集诱导发光国际研讨会暨翔龙鸣凤科学论坛”过程中，在开幕大会上有幸听取了美国伊利诺伊大学 Jeffrey S. Moore 院士、新加坡国立大学刘斌教授以及被誉称为“AIE 之父”的唐本忠院士精彩报告。他们独特且深入的理解是我平时在读取文献中所获取不到的，俗话说“听君一席言，胜读十年书”便是如此，第一次外出参加会议就受益匪浅。

首先，大会主会场报告有讲到聚集诱导发光材料的发展前景、发光机理以及 AIE 领域的未来发展动向，这与我目前的簇集发光研究方向密切相关，让我从跨空间共轭机理的设计到发光材料的制备，再到后面如 OLED 器件的应用也有了一个比较全面且深入的理解。

其次，这是我第一次进行海报展示，难免手忙脚乱、思虑不周，也很遗憾没有获得奖项。但值得一提的是，在海报展示过程中碰见唐院士的学生，我现在及以后的课题会涉及到超分子组装及共晶材料等方向，在平日阅读文献中了解到唐院士课题组不只是研究聚集诱导发光材料，在分子共晶等晶体工程领域也有所突破，所以在这次会场中遇见他们



也是难免激动，抓住机会与他们进行深入探讨，询问平时看他们工作时的不解之处。

简言之，科研之路，道阻且长，行而不辍，未来可期。

During this “Fifth International Symposium on Aggregation-induced Emission and Long Feng Science Forum”, I was so fortunate that I attended the lectures by US National Academy of Sciences member Prof. Jeffrey S. Moore of University of Illinois, Prof. Liu Bin of National University of Singapore, and “Father of AIE” CAS academician Prof. Tang Benzhong, whose unique and profound understandings are beyond my reach in my daily literature reading. As the saying goes, “Listening to a wise man’s words is better than reading a book for ten years”, and I really benefited a lot from my first attending an academic conference.

First, the main session reports of the conference talked about the development prospects and the light emitting mechanism of Aggregation-induced Emission (AIE) materials, and the development trend of AIE studies. This is closely related to my current research in clustered luminescence, and enabled me to obtain a more comprehensive and deeper understanding from the design of cross-space conjugate mechanism to the preparation of luminescent materials, and then to the application of OLED devices.

Secondly, as this was my first poster presentation and my preparation was not so neat and thorough, unfortunately I did not win any award. But it is worth mentioning that during poster display, I was so excited to meet some students of Prof. Tang, so I seize the opportunity to have an in-depth discussion with them, asking them about the puzzles I had from reading their work, as I learned from my literature reading that their group not only focused on aggregation-induced emission materials, but also made breakthroughs in the field of crystal engineering such as molecular eutectics.

In short, the road of scientific research is obstructive and long; work on unremittingly and the future can be expected.

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