Meet Prof. Qing He, Thieme Chemistry Journals Awardee 2025!

Prof. Qing He *obtained his PhD in chemistry in 2015 from the Institute of Chemistry, Chinese Academy of Sciences (ICCAS). Following this, he conducted postdoctoral research at The University of Texas at Austin (2015–2019). In 2019, he joined Hunan University as a full professor of chemistry.*

Thieme: Which field of organic chemistry are you interested in the most and why?

Prof. He: I am particularly fascinated by supramolecular chemistry, as it explores the fundamental non-covalent interactions that govern molecular assembly, recognition, and function. This field provides deep insights into the nature of covalent and non-covalent forces, which underpin the structural and functional organization of matter. By leveraging principles of host–guest chemistry, self-assembly, and molecular recognition, supramolecular chemistry enables the rational design of advanced materials, catalytic systems, functional nanostructures and beyond. Its inherently interdisciplinary nature bridges organic chemistry with materials science, biology, and nanotechnology, driving innovations in areas such as precision separation, drug delivery, molecular sensing, and artificial molecular machines.

Thieme: Following that, what is the focus of your current research activity?

Prof. He: My current research focuses on the design and development of novel functional (supra)molecular architectures, including superphanes with enclosed or near-enclosed cavities and pyrgoscages featuring multi-decker molecular cages. These precisely engineered structures enable highly selective spatial entrapment of guest species of interest, such as ions, ion clusters, and metal nanoclusters, making them exceptionally versatile for applications in advanced materials, energy storage and conversion, environmental remediation, and biomedical sciences. By exploring innovative molecular cage and framework systems, my work aims to address critical challenges in supramolecular separation, catalysis, and sustainable technologies, ultimately contributing to the development of next-generation functional materials.

Thieme: What do you think about the modern role and prospects of organic chemistry?

Prof. He: Organic chemistry remains at the forefront of scientific innovation, driving breakthroughs across pharmaceuticals, materials science, and sustainable technologies. Its central role in drug discovery addresses global health challenges, including antibiotic resistance and personalized medicine, while its contributions to polymer science, organic electronics, and green synthesis advance renewable energy and environmentally friendly manufacturing. The field's future is shaped by interdisciplinary integration with computational chemistry, nanotechnology, and biotechnology. Emerging approaches such as machine-learning-guided synthesis and bioorthogonal chemistry are redefining precision molecular engineering. As society demands sustainable and efficient solutions, organic chemistry's adaptability ensures its continued relevance, paving the way for carbon-neutral processes, advanced therapeutics, and next-generation functional materials.

Thieme: Which difficulties are there for young upcoming chemists in your field? Do you have any tips?

Prof. He: Young chemists entering the field, particularly in supramolecular chemistry and functional molecular design, often face challenges such as mastering complex interdisciplinary concepts, accessing cutting-edge instrumentation, and navigating the uncertainties inherent in exploratory research. The rapidly evolving nature of the field requires not only a solid grasp of fundamental principles but also the ability to integrate knowledge from organic synthesis, materials science, and computational modeling. To overcome these difficulties, I encourage young researchers to cultivate resilience, curiosity, and adaptability. Embrace challenges as opportunities for learning, and do not be discouraged by setbacks—scientific progress is often driven by persistence through failure. Developing strong problem-solving skills, seeking mentorship from experienced scientists, and actively engaging in collaborations across disciplines will provide valuable perspectives and accelerate progress. Furthermore, staying informed about emerging trends and technological advancements through literature, conferences, and scientific discussions is essential for identifying impactful research directions. Finally, never lose sight of the bigger picture. Chemistry has the power to address global challenges in energy, sustainability, and healthcare. Aligning research goals with these pressing issues can provide motivation and a sense of purpose. The journey may be demanding, but perseverance, critical thinking, and a passion for discovery will ultimately pave the way for meaningful contributions to science and society.

Thieme: What is your most important scientific achievement to date and why?

Prof. He: One of my most significant scientific achievements to date is the development of functional molecular systems with protein-like internal cavities. Unlike conventional supramolecular hosts, these systems feature fully enclosed or near-enclosed molecular cavities, high-density recognition sites, and exceptional resistance to solvation effects. These unique structural attributes have enabled the stabilization of water clusters, ion hydrates, the detoxification of highly toxic species, and the ultra-stabilization of metal nanoclusters—challenges that traditional functional molecules struggle to overcome. Furthermore, these molecular constructs have facilitated exceptionally efficient and highly selective separations of target guest species, laying a solid foundation for next-generation advanced separation technologies.

Thieme: Could you tell us something about yourself outside the lab, such as your hobbies or extra-work interests?

Prof. He: Beyond the lab, I have a deep passion for tennis. The sport not only provides a refreshing physical challenge but also serves as a great metaphor for scientific research—both require strategic thinking, perseverance, and the ability to adapt under pressure. Whether on the court or in the lab, success often comes from refining techniques, analyzing patterns, and continuously pushing one's limits. Tennis also offers a valuable balance to the demands of research, helping to clear the mind and maintain focus. Apart from sports, I enjoy reading and exploring interdisciplinary fields, which often spark new ideas and inspire creative approaches to scientific problems.