Meet Dr. Pradip Pachfule, Thieme Chemistry Journals Awardee 2025!

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Dr. Pradip Pachfule *studied chemistry at Solapur University, India and graduated in 2008. He received his PhD in 2014 from the National Chemical Laboratory, Pune and then joined AIST, Kansai, Osaka, Japan, as a JSPS postdoctoral research fellow. He then worked at the Technische Universität Berlin, Germany, as an Alexander von Humboldt postdoctoral fellow and later as a postdoctoral research fellow from 2017 to 2021. He is currently an associate professor at S. N. Bose National Centre for Basic Sciences, Kolkata, India.*

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

Dr. Pachfule: I am interested in the field of synthetic organic chemistry and, in particular, the development of novel linkage chemistries and building blocks for the synthesis of covalent organic frameworks (COFs). This interest stems from the need to design and construct stable, crystalline, and functional COFs with tailored properties for photocatalysis, electrocatalysis, and energy applications. Understanding reaction mechanisms, optimizing synthetic routes, and exploring new covalent bond formations (imine, olefin, etc.), which are crucial to improving the stability, porosity, and electronic properties of COFs. This enables their applications in water splitting for hydrogen evolution, CO_2 reduction, energy storage and photocatalytic organic transformations. Furthermore, my interest extends to functionalization strategies that introduce specific electronic, optical, or catalytic properties into COFs, allowing them to be fine-tuned for targeted applications in sustainable energy and green chemistry.

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

Dr. Pachfule: My current research focuses on the development of COFs for applications in photocatalytic water splitting, photocatalytic organic transformations and energy storage. In particular, I am interested in the design and synthesis of highly stable and functional COFs with tailored electronic structures and surface properties to enhance their light harvesting, charge separation and catalytic efficiency. For photocatalytic water splitting, my work aims to develop metal-free and metal-coordinated COFs for efficient hydrogen evolution through the rational design of donor–acceptor architectures and heterostructures. For photocatalytic organic transformations, I am exploring COFs with tunable active sites to drive selective and sustainable organic reactions. In addition, my research extends to energy storage applications, where I am investigating COFs with high redox activity and ion transport properties for next-generation batteries and supercapacitors.

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

Dr. Pachfule: Organic chemistry plays a central role in modern materials synthesis, particularly in the development of functional organic frameworks, polymers, and hybrid materials. Its ability to precisely control molecular structures and tailor chemical and electronic properties makes it essential for the design of next-generation materials with applications in energy conversion, storage, and environmental remediation. In the context of COFs and other crystalline organic materials, organic chemistry enables the rational design of robust linkages, π-conjugated backbones, and tailored porosity that are critical for achieving high stability, efficient charge transport, and tunable reactivity. Advances in synthetic methodologies, catalytic coupling strategies, and post-synthetic modifications are expanding the scope of COFs in areas such as photocatalysis, electrocatalysis, and molecular separation. Looking ahead, organic chemistry will continue to drive innovation in sustainable materials, with prospects in bio-inspired synthesis, dynamic covalent chemistry, and multifunctional hybrid frameworks. The integration of machine learning, automation, and high-throughput screening will further accelerate the discovery of novel organic materials with precisely engineered properties for energy and environmental applications.

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

Dr. Pachfule: There are certainly challenges in the field, but research also brings many rewarding and exciting moments. One of the most significant difficulties for young chemists is managing the vast and rapidly expanding literature and finding suitable job opportunities. With new journals and publications appearing every day, keeping up with the latest advances can be overwhelming. However, staying up to date is crucial to understanding the progress of the field, identifying research gaps, and shaping innovative ideas. To manage this, researchers should:

- Set up alerts on platforms such as Google Scholar and Scopus for key topics and authors.
- Follow leading journals and review articles to get a broader perspective.
- Attend discussions at conferences and seminars to keep up with the latest trends.
- Maintain a well-organized reference manager to keep track of important papers.

Despite the challenges, chemistry is a unique field where new discoveries are made every day, making the journey both stimulating and fulfilling. The key is to remain curious, open-minded and persistent.

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

Dr. Pachfule: My major scientific achievement to date is the development of a self-templated catalyst-free strategy for the synthesis of one-dimensional carbon nanorods through the morphology-preserved thermal transformation of rod-like metal-organic frameworks (MOFs). These solid carbon nanorods can be further transformed into two- to six-layer graphene nanoribbons by sonochemical treatment followed by chemical activation. This method not only provides a simple and energy-efficient route to produce carbon nanomaterials, but also demonstrates their excellent performance in supercapacitor electrodes (*Nat. Chem.* **2016**, *8*, 718–724). In addition, the approach is scalable, making it a promising strategy for the large-scale production of carbon-based energy storage materials.

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

Dr. Pachfule: Outside the lab, I enjoy playing cricket, which helps me to stay active and refreshed. I also enjoy visiting beautiful natural places, as being in nature provides a sense of peace and inspiration. In addition, I have a keen interest in watching documentaries, especially those related to science, history and nature, as they offer new perspectives and insights beyond my field of research. These activities help me to maintain a balanced life and bring fresh energy to my work.