

## MOFs in the Spotlight: Nobel Prize 2025 and JUK Materials

The 2025 Nobel Prize in Chemistry has firmly established Metal–Organic Frameworks (MOFs) as a cornerstone of modern materials science, recognizing their transformative impact on sustainable technologies and energy applications.<sup>1</sup> MOFs represent a large group of materials characterized by modular architecture, common crystallinity, and functional porosity - features that enable unique opportunities for design and investigation across diverse applications including gas storage and separation, chemical sensing, catalysis, drug delivery, capture of hazardous substances, and energy storage and conversion.

This seminar will explore the scientific breakthroughs behind the Nobel-winning research and showcase our own contributions, focusing on JUK materials developed at Jagiellonian University in Kraków. Selected JUK-x systems will be presented as proton conductors,<sup>2</sup> responsive components of chemiresistive sensors,<sup>3</sup> and reactive platforms for post-synthetic modification,<sup>4</sup> demonstrating their potential for advanced functional applications and future innovations.

### References:

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### Short bio

Dariusz Matoga is a professor at the Faculty of Chemistry, Jagiellonian University in Kraków, Poland. His research focuses on the design and synthesis of functional framework materials, particularly Metal–Organic Frameworks (MOFs) and related porous systems with responsive and proton-conducting properties. A key aspect of his work is the use of environmentally friendly, solvent-free mechanochemistry for the synthesis and modification of these materials. He earned all his scientific degrees at Jagiellonian University (MSc 1999, PhD 2003, habilitation 2015) and has been a full professor in Chemical Sciences since 2023. His international experience includes research stays in Germany (Universität Erlangen–Nürnberg), Japan (Kwansei Gakuin University), and Oman (Sultan Qaboos University).

Currently, he leads a research group developing innovative MOFs under the JUK materials brand and has served as principal investigator on multiple projects funded by the National Science Centre (NCN). His work advances sustainable approaches in materials chemistry and energy-related applications.