

High-Performance Adsorbents: The Future of Clean Industry

Transforming Proven Science into Scalable Purification Solutions

Porelio is revolutionizing pollutant removal with advanced adsorbents, Functionalized Ordered Mesoporous Silicas (FOMS). Targeting PFAS, metals, and genotoxins in water and industrial products, FOMS outperform commercial solutions with unmatched selectivity and power. With its innovative, sustainable production process, Porelio is turning decades of proven scientific research into a scalable, high-impact solution for global pollution challenges. Two co-founders shared their vision to transform purification.

CHEManager International: What does the name Porelio mean?

Rhea Machado: Porelio combines “pore,” representing the porous systems central to our technology, and “rheology,” the science of flow. It reflects our focus on enhancing the selective capture of pollutants within nano-scale tunnels from flowing streams.

How would you describe FOMS in simple terms?

Javier Silva: Functionalized Ordered Mesoporous Silicas (FOMS) are like advanced sponges with uniformly aligned, open pores. Their surfaces feature molecular “arms” that selectively capture pollutants with high efficiency. Unlike traditional adsorbents, FOMS offer a tunable, ordered structure, enabling superior selectivity, faster adsorption, and higher capacity, making them ideal for purification challenges.

PFAS pollution is a pressing issue. How does Porelio tackle PFAS contamination?

R. Machado: PFAS, especially short-chain variants, are hard to remove due to their low concentrations and persistence. Porelio’s FOMS adsorbents provide a scalable, highly selective solution for efficient PFAS removal, helping industries meet strict regulations cost-effectively without compromising performance.

What makes Porelio’s technology unique?

J. Silva: While FOMS have been known for their adsorption properties for decades, their industrial use was limited by high costs and production challenges. Porelio’s patented continuous synthesis process makes FOMS scalable and affordable, replacing outdated adsorbents with a solution that combines efficiency and cost-effectiveness.

Which industries benefit most from Porelio’s technology?

R. Machado: Water treatment and fine chemical production face significant purification challenges due to tightening regulations and the limitations of conventional adsorbents. Porelio’s FOMS offer a selective, durable alternative, ensuring compliance and re-

“Unlike traditional adsorbents, FOMS offer a tunable, ordered structure, enabling superior selectivity, faster adsorption, and higher capacity, making them ideal for purification challenges.”

ducing costs. In fine chemicals and pharmaceuticals, our technology enables precise separations with fewer steps, cutting energy use and waste while improving efficiency.

Why was Porelio founded in Berlin?



Rhea Machado, Porelio



Javier Silva, Porelio

J. Silva: Berlin is emerging as a green chemistry hub, and Porelio benefits from this ecosystem. GreenChem provides lab infrastructure and industry access, while UniSysCat, the Cluster of Excellence for catalysis and materials science, connects us to top researchers. This synergy helps us translate cutting-edge research into industrial purification solutions.

What’s next for Porelio?

R. Machado: Porelio is scaling FOMS production from kilos to tons and optimizing material performance for industrial readiness. We’re collaborating with partners for pilot validation and demonstrating feasibility in real-world applications. For wastewater treatment, we’re addressing PFAS and emerging contaminants, while in fine chemicals and pharmaceuticals, our materials enhance separation efficiency and reduce costs. We’re also engaging investors to support scaling deep-tech innovations, driving our transition from lab to industry. Beyond purification, we aim to transform the chemical industry and the world by tackling pollution removal at its source, enabling cleaner production processes and contributing to a sustainable future.

PERSONAL PROFILES

Rhea Machado is a process engineer and entrepreneur pioneering green chemistry solutions. She holds a Master’s in Process Engineering from Hamburg University of Technology and a PhD from BasCat, a BASF-TU Berlin joint lab, specializing in heterogeneous catalysis. She played a key role in scaling Porelio’s technology from lab to pilot scale and now leads the company as CEO. With a strong focus on innovation and sustainability, she oversees the company’s growth and leads the business strategy to revolutionize industrial purification by ensuring sustainable scalability.

Javier Silva is a chemist specializing in materials science, catalyst synthesis, and molecular chemistry. During his research at BasCat, he developed model catalysts via surface modification, laying the foundation for the groundbreaking research to achieve the world’s fastest, most energy-efficient, and cost-effective synthesis of FOMS, overcoming a major commercialization barrier. As CTO of Porelio, Javier leads the scientific strategy to develop cutting-edge green chemistry solutions to address global pollution challenges, driving innovation in sustainable materials.



BUSINESS IDEA

Revolutionizing Industrial Purification: Porelio's Breakthrough Adsorption Technology

Industries like pharmaceuticals, fine chemicals, and water treatment face mounting challenges due to inefficient purification processes, rising costs, and stringent regulations. For instance, the global PFAS removal market, valued at \$2.05 billion in 2023, is projected to grow at a CAGR of 7.15% as regulations tighten and contamination concerns escalate. Current solutions struggle with scalability, selectivity, and sustainability, creating an urgent need for innovation.

Porelio has a solution for pollutant removal that will be a game-changer, including for PFAS removal. Functional Ordered Mesoporous Silicas (FOMS) are advanced adsorbents offering unparalleled selectivity for hard-to-remove pollutants, cost-effectiveness, and sustainability, enabling industrial-scale purification for the first time. Porelio has cracked a 20-year scalability challenge in adsorption technology with its patented production process. FOMS outperform traditional materials like silica gels, activated carbon, polymeric resins and membranes, delivering superior performance at competi-

tive prices, making them accessible for widespread adoption.

At the core of Porelio's innovation is a patented continuous synthesis process that ensures scalable, energy-efficient, and cost-effective FOMS production. This breakthrough reduces manufacturing time, energy consumption, and material costs compared to conventional methods, all of which has been validated at the kilo scale in a pilot plant.

Porelio's customizable FOMS address critical industry needs, from removing persistent PFAS contaminants to optimizing API purification and eliminating genotoxic impurities. By enhancing efficiency and compliance while reducing operational costs, FOMS empower industries to meet evolving regulations sustainably.

Currently, Porelio is validating FOMS in real-case scenarios, including PFAS removal and pharmaceutical manufacturing. With its transformative adsorption technology, Porelio is poised to redefine industrial purification, offering scalable, sustainable solutions for a cleaner, more efficient future.

■ Porelio, Berlin
www.porelio.com



ELEVATOR PITCH

Purification, Perfected — Scalable, Sustainable, and Game-Changing

Industries like water treatment face a \$2.05 billion PFAS crisis, struggling with inefficient and costly purification. Porelio's breakthrough Functional Ordered Mesoporous Silicas (FOMS) solve a 20-year scalability challenge, delivering unmatched selectivity, cost-efficiency, and sustainability. Our patented synthesis enables industrial-scale production, validated in real-world PFAS and pharmaceutical applications. Porelio transforms purification, slashing costs, ensuring compliance, and driving a cleaner, greener future.

in real-case scenarios; Expansion of catalogue of FOMS for different impurity removal

2025

- Foundation of Porelio; 7 employees

Roadmap

We are currently in the process of rigorously validating our FOMS technology for the removal of PFAS and genotoxic impurities under real-world conditions, with direct input and collaboration from industrial partners to ensure practical applicability and effectiveness. Following this validation phase, our roadmap includes scaling up through paid pilot projects to demonstrate the technology's viability at a larger scale, partnering with a contract manufacturing organization (CMO) to enable large-scale production and delivery, and securing strategic funding to establish our own state-of-the-art mass-production facility. By joining forces with us, you can play a pivotal role in revolutionizing contaminant removal, driving innovation, and creating a cleaner, safer, and more sustainable future for industries worldwide. Together, we can transform the way the world tackles pollution!

Milestones:

2020

- Securing €1.1 million in non-dilutive funding from the German Ministry of Education and Research for scale up validation

2022

- First patent granted

2023

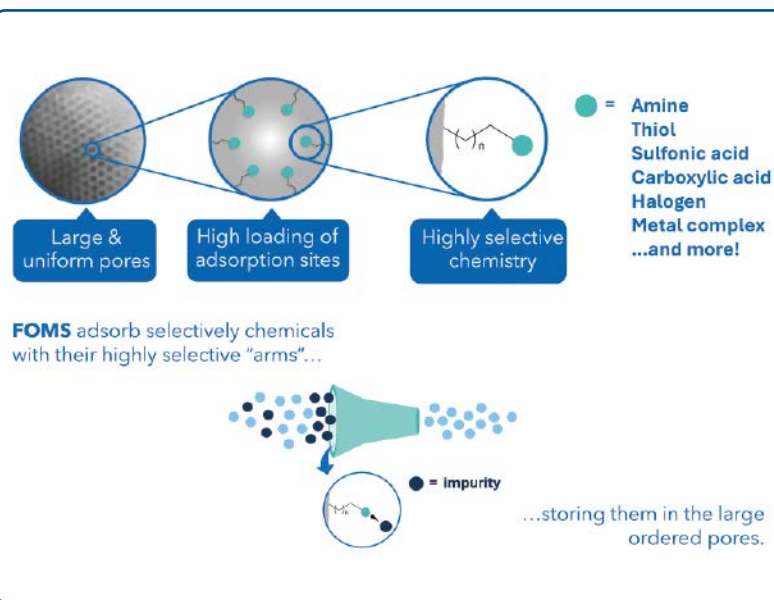
- Successful validation of scaleup to the kilo scale of one prototype

2024

- Securing €1.2 million in non-dilutive funding from the German Ministry for Economic Affairs and Climate Action for FOMS pilot testing



Porelio's pilot plant enables scalable, continuous synthesis of functionalized ordered mesoporous silica (FOMS), optimizing adsorption performance for industrial applications.



FOMS: High-capacity adsorbents with large, uniform pores, high adsorption site loading, and selective chemistry—efficiently capturing impurities for advanced purification.