Creaflow develops flow-through plate reactors for photo- and electrochemistry that are seamlessly scalable and easy to adapt to specific reaction conditions.

“Creaflow emerged as a spin-off from Ecosynth, which had developed a highly performant reactor for managing small-scale chemical reactions, using light or direct electrical current as the activation source instead of heat,” explains entrepreneur Rik Van Meirhaeghe, who acquired the company in 2024.

New avenues

“We succeeded in designing a plate which enabled intense mixing and heat exchange by using a combination of static mixing elements and pulsatiflow,” reflects Dr. Koen Van Aken, chief scientist and founder of Creaflow. “Uniquely for flow reactors, the mixing intensity and flow rate are independent of each other which allowed slow reactions but also to work with solid particles at any flow rate, a long known barrier for applying flow chemistry.”

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“The most common chemical reaction on Earth—photosynthesis—is a photochemical reaction. Yet, we saw few industrial applications of photochemistry at scale. While it opens up entirely new pathways, often inaccessible through traditional chemistry, we realized that our reactor design could also prove valuable to other companies. That realization sparked the idea of establishing a spin-off.”

Incubator

Even before Creaflow was officially launched, Ecosynth – together with Japanese partner Ajinomoto Omnichem and with support from VLAIO— initiated a project to develop a linearly scalable version of a photoreactor. Later, KU Leuven and the University of Antwerp also joined the follow-up research.

Today, Creaflow collaborates with several SMEs, primarily active in flow chemistry. It is no coincidence that the company chose to establish itself at BlueChem in Antwerp,

Belgium’s first incubator dedicated to sustainable chemistry.

Almost no waste

Sustainability is at the heart of Creaflow’s approach. “It’s reflected not only in the energy sources we use, but also in the raw materials and reagents,” says Van Aken. “An example are oxidation reactions using oxygen, which is abundant and inexpensive. In addition, photochemistry and electrochemistry generate almost no waste streams, while reactions take place at safe temperatures and pressures.”

“All of this works in our favour,” adds Van Meirhaeghe, “because today’s economic and political debates increasingly focus on energy costs, legal standards, and sustainability measures.”

Creaflow’s technology pushed the borders of flow chemistry and is making its mark. “Companies like Roche and Pfizer are using our reactors. Our current offering includes several dedicated reactors enabling a wide range of chemistries including multi-phase reactions. Beyond pharmaceuticals, they are also deployed in the fine chemical industry, for instance in the production of fragrances and flavours.”

Forward-thinking users

Customers use Creaflow’s reactors to manufacture end products, to make existing processes more sustainable, to scale them up, and to develop entirely new ingredients. “These are companies with a long-term vision,” notes Van Meirhaeghe. “The development of a new pharmaceutical molecule is a lengthy process in which there is always a point when a switch from the lab protocol to a scalable industrially viable protocol is necessary, ideally as far as possible in the development pipeline. A major advantage of our technology is that it can be scaled up linearly in all dimensions without altering the process which significantly reduces time-to-market.”

Future outlook

“Growth to industrial scale isn’t just about the technology,” emphasizes Van Meirhaeghe. “Industry demand is equally crucial. In today’s uncertain geo-economic climate, companies are understandably cautious about investments that only pay off after many years but also have to take into account to the current trend of deglobalisation. Still, many large international companies order our reactors for the development of their products in a wide range of applications.”

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