



Flow Chemistry Highlights

Flow Chemistry Network

An Interview with Jean-Philippe Krieger, Syngenta Crop Protection AG

In this month's column, we have the pleasure to interview Jean-Philippe Krieger, who works at Syngenta Crop Protection AG as a Principal Process Science Specialist.



Flow Chemistry Network:

What brought you to the field of flow chemistry, and what made you stay and contribute in the area?

Jean-Philippe Krieger:

One of my team's objectives is to provide mechanistic and kinetic investigations to support development teams in relevant business contexts. Additionally, we are involved in the implementation and comprehension of non-conventional production technologies such as photochemistry and electrochemistry, where flow chemistry serves as an enabling technology for both endeavors.

Flow Chemistry Network:

To your mind, what have been the major developments in the field over those years?

Jean-Philippe Krieger:

From a manufacturing perspective, the benefits of flow chemistry become evident when synthetic routes previously deemed forbidden in batch become possible, allowing the reduction of the number of steps which directly benefit environmental and cost aspects. The broader chemical industry is increasingly adopting this technology, leading to more quantitative assessments of the environmental impact of continuous versus batch processes.

This supports the assertion that, when applicable, continuous operation is generally a more environmentally friendly mode than batch processing.

Flow Chemistry Network:

What are the exciting innovations in the field today which you think could give it even greater impact?

Jean-Philippe Krieger:

Improving further the efficiency and reducing the environmental footprint of chemical processes, using continuous technologies, ultimately translates into a genuine positive societal impact. Along those lines, I think there is still much effort to have more manufacturing-relevant processes relying on photo- and electrochemistry, as photons and electrons are the greenest 'reagents' you can think of. Another promising advancement is the growing adoption and standardization of automation and rapid data analysis, facilitating the maximization of insights from data-intensive experiments.

Flow Chemistry Network:

What should a young researcher/industrial chemist keep in mind when embarking on using flow processing?

Jean-Philippe Krieger:

Be curious and ready to interact at the interface of disciplines! Flow chemistry is an ideal technology to have chemists, engineers, data scientists and PAT specialists working together, allowing innovative processes and workflows to emerge.

Flow Chemistry Network:

Flow chemistry is already being considered as a mature technology. What is left to do to make this a standard tool for chemists and chemical engineers?

Jean-Philippe Krieger:

Batch processing is a standard component of chemical engineering education, whereas chemists often encounter it practically during initial academic or industrial experiences. As a result, batch operations are widespread, and established companies predominantly possess batch assets. Establishing continuous manufacturing capabilities necessitates a significant investment, potentially impeding the deployment of this mature technology.

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Would you like to propose a Flow Chemistry Highlight topic here?

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