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Flow Chemistry Highlights

Flow Chemistry Network

An Interview with Thomas Ferrari

For this Flow Chemistry Column, we are happy to interview Thomas Ferrari, chemist at Bachem AG in Bubendorf.



Flow Chemistry Network:

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

Thomas Ferrari:

The first time I was confronted with flow chemistry was during my studies – seeing the potential of this technology, allowing for process intensification to outperform standard batch chemistry and to be able to carry out reactions under conditions not easily manageable in batch. This made me curious and want to try it out. A couple of years ago, I started implementing flow chemistry at Bachem to see whether this approach could be of interest for the kind of chemistry we do.

Flow Chemistry Network:

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

Thomas Ferrari:

Flow chemistry has become an attractive technology, enabling previously forbidden reactions by reducing risk in microreactors. Its role in green chemistry has also driven adoption, intensifying processes while minimizing solvent use and waste. Additionally, its seamless integration with photochemistry and electrochemistry has expanded its applications.

Flow Chemistry Network:

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

Thomas Ferrari:

Flow chemistry allows for fast gathering of experimental data, allowing us to understand and optimize processes very quickly. With advances in optimization algorithms, machine learning, and AI, integrating these technologies with flow chemistry could significantly enhance its capabilities.

Flow Chemistry Network:

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

Thomas Ferrari:

Start with an open mind and be open to learn by doing! Flow chemistry is a platform where multidisciplinary is a must. As a chemist, learning basic engineering is essential to understand your setup's capabilities, limitations, weak points, and potential benefits for your reaction. If you are trying to optimize a process, be prepared to develop yourself in the PAT field – developing strong and fast analytics to generate data is not an easy task. Data science can help you navigate through all your data and formulate meaningful hypothesis and a better understanding of your process. Seek collaboration with field specialists and learn from your mistakes – progress is made through experience and collaboration!

Flow Chemistry Network:

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

Thomas Ferrari:

Flow chemistry is gradually gaining traction in the mainstream chemical industry. While it is widely adopted in Asia for process development, scepticism still lingers in the European chemical and pharmaceutical sectors. For this reason, I wonder if flow chemistry can already be considered mature. I believe many people remain unaware of flow chemistry's potential and advantages simply because they've never encountered or been taught about it. To make flow chemistry a standard tool for chemists we should change how we approach product development and start thinking about flow chemistry from an early project phase.

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

Please contact Christophe Allemann or Claudio Battilocchio, E-mail: christophe.allemann@hefr.ch; claudio.battilocchio@syngenta.com