

Sustainable Pharmaceutical Process R&D Enabled by Flow Chemistry Martin, B.

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Continuous Manufacturing is the result of industrializing flow chemistry, and the focus of this presentation will be the application to synthesizing medicines.¹ The fundamental principles of how continuous processes can impact a chemical reaction are outlined, and the connection to green chemistry is given.

The key learnings from three case-studies in the areas of hydrosilylative reduction and organometallic chemistries will be highlighted,²⁻³ taking the listener from the lab discoveries to the final processes and equipment rigs used for manufacturing on kilogram scale. Decision making as to when to use flow equipment, and when to use batch, as well as strengths and weaknesses of the new processes will be shared.

The aim is to showcase continuous manufacturing as a mature enabling technology which has green credentials, and can be relied upon to support the synthesis of complex pharmaceutical building blocks.



1. Martin, B.; Lehmann, H.; Yang, H.; Chen, L., Tian, Xiangguang T.; Polenk, J.; Schenkel, J. *Current Opinion in Green & Sustainable Chem.*, **2018**, *11*, 27
2. Susanne, F.; Martin, B.; Aubry M.; Sedelmeier J.; Lima, F.; Sevinc, S.; Piccioni, L.; Haber, J.; Schenkel, B.; Venturoni, F. *Org. Process Res. Dev.*, **2017**, *21*, 1779
3. Gu, X.; Kleinbeck F. *et al.*, *J. Org. Chem.*, **2020**, *85*, 6844