

An HPLC-based System for the Rapid Measurement of Residence-time-distribution Curves for Commercially Available Static-mixers

An intrinsic limitation encountered in flow-chemistry development is the lack of convective transport (active mixing) that occurs under the flow rates typically used during process development and subsequent scale-up. Many solutions to this issue have been applied with perhaps the simplest being the addition of a static-mixer directly in the flow path. Static-mixers are commercially available and available in many shapes and sizes. Characterization of these mixers provides the ability to choose the correct mixer for the application. More importantly, characterization is essential to model and predict scale-up conditions. Residence-time-distribution studies are a classical and powerful way to gain insight into the extent to which a static-mixer is able to improve mass transport. In this presentation, the use of a liquid chromatographic system to rapidly measure residence-time-distributions of static-mixers of varying diameter and configuration are discussed. In addition, the effect solvent viscosity has on the ability of the static-mixer to improve mass transport is assessed. The conclusions drawn from these studies provide an important piece of data in designing flow-chemistry systems that are productive, robust, and readily scalable.

Andrew M. Clausen
BioSketch

Andy is currently Vice President and Chief Operating Officer at Snapdragon Chemistry Inc. a flow-chemistry development company based in Cambridge, MA. Andy received is PhD in Analytical Chemistry under the direction of Professor Peter Carr at the University of Minnesota after completing a BS in Chemistry at Iowa State University. After completing his graduate studies, he accepted a position in Analytical Research at Merck & Co., Inc. in Rahway, NJ. While at Merck Andy contributed to analytical development and chemical reaction engineering of EMEND® and JANUVIA® drug substances. Prior to leaving Merck Andy was responsible for the late stage development Analytical Development and Solid-state Chemistry groups. In 2008 Andy joined Amgen as a Director in Analytical Research & Development where he helped to build and train groups at the Cambridge, MA and Thousand Oaks, CA sites. His final role at Amgen was as the lead of Commercial Analytical Sciences where he was responsible for groups at Amgen's commercial production sites world-wide.