RAPID CHEMICAL SPACE EXPLORATION IN BATCH AND FLOW

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Flow Chemistry is currently an area of intense research interest in both Industry and Academia. Running reactions in flow offers significant advantages over conventional batch chemistry. These include (amongst others) an ability to have an unprecedented level of control over the reaction conditions thus leading to cleaner and faster reactions, as well as the opportunity to work with hazardous and toxic reagents. Furthermore, scaling up a reaction should be an extremely facile process as output quantities are measured as a function of time as opposed to scale.

The development and application of a meso scale flow reactor for library production and automated reaction optimization using minimal amounts of material is presented. Flowing reaction segments each corresponding to different library elements, reagent compositions, residence times, or temperatures are cleanly separated from one another by fluoros spacers. Multiple segments can be flowed through the system simultaneously and the incorporation of an in-line sampling module that in combination with UPLC/MS, enables a yield and purity calculation in real-time between segments.

A flow technology is presented with the capability to run and analyze 100-300 reactions per day. The application of this technology to reaction optimization and library preparation is presented.