

Flow Calorimetry

K. Hellgardt

Department of Chemical Engineering

Imperial College London

Flow Calorimetry is not a new invention. However with the advent of Flow Chemistry and the promotion of small scale continuous processing of fluids for high performance chemicals, there could be some intrinsic advantages of small scale continuous calorimetry to support the evaluation of kinetic parameters and the assessment of safety implications.

Flow calorimeters have advantages in that they can be operated at steady-state, leading to the development of a thermal profile within the reactor, which could be analysed for kinetic purposes. Flow calorimeters also allow for more controlled and process relevant contact with heterogeneous catalyst. Furthermore, at steady-state, the thermal mass of the apparatus becomes irrelevant, which is impossible to achieve for a batch calorimeter. However, due to the continuous nature of a flow calorimeter, the quantity of available sample sizes can negate its operation.

This talk will cover some of the basic drivers of flow chemistry that are leading to the re-evaluation of and development of novel flow calorimetry systems. System development at Imperial College will be discussed with respect to two systems that have been designed, built and evaluated using a few test/model reactions.

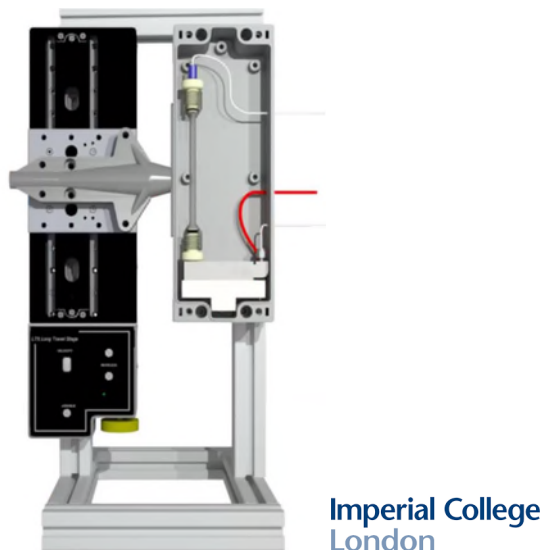


Figure 1: Prototype flow calorimeter (Design: Ilia Dorokhov)