

Module 3: Experimental design for a safety study

The **thermal** risks of a synthesis step with an exothermal bimolecular reaction ($A+B\rightarrow P$) must be assessed. For this the required thermal data have to be determined in a safety laboratory equipped with a reaction calorimeter and a DSC. The process can be described as follows:

1. Charge the total amount of A solution (10 kmol) into the reactor. The solvent is mesitylene with a boiling point of 165 °C.
2. Heat this solution to the process temperature of 140 °C
3. At this temperature add 12 kmol of B at a constant rate during four hours.
4. Heat to 150 °C
5. Maintain this temperature during four hours.
6. Cool to 80 °C. The product P precipitates.
7. Transfer to filter.

Questions

1. Describe the required experiments allowing for the determination of the criticality class.
2. What data will you obtain from the different experiments?