

## Preventing Chemical Reactivity Hazards

Safe design and operation of chemical processes requires a thorough understanding of chemical reactivity and thermokinetics. Development of this understanding in an efficient, cost-effective manner involves multiple steps:

- Developing test plans
- Interpreting results
- Conducting tests
- Completing detailed analyses

ioKinetic consultants can help you implement any or all of these steps, depending on your specific needs.

## Test Plan Development

Test plans can be designed to address any need, such as thermal hazard analysis of a new process, pressure relief and flare system design, incompatibility studies, kinetic model development or simply to identify decomposition reactions to avoid.

## Testing

We house an ISO accredited testing facility that is equipped with a variety of instruments that perform adiabatic reaction calorimetry, differential scanning calorimetry and thermogravimetric analysis.

## Data Interpretation

Understanding the data is a critical step in the overall testing process. Our consultants combine decades of experience in evaluating and interpreting raw data for effective application to your specific needs.

## Analysis

Coupling the test data with our process simulation software, Process Safety Office™, our consultants can complete detailed thermal hazard analyses such as pressure relief design, chemical reactivity assessment and management, consequence analysis and quantitative risk analysis.

At ioKinetic, our consultants use the combination of thermal hazard data interpretation and process simulation to help solve your complex problems.



## Typical Applications

Thermal characterization  
 Reaction onset temperature  
 Adiabatic temperature rise  
 Heat-of-reaction  
 Process simulation  
 Scale-up  
 Pressure relief and flare system design  
 Safe operating limits  
 Process safety limits  
 Isothermal evaluation  
 Safe storage conditions  
 Kinetic modeling  
 Boiling/melting points  
 Process optimization  
 Regulatory compliance

Technique	Measurement
Adiabatic Reaction Calorimetry	Temperature and pressure changes as a result of exothermic reactions
Differential Scanning Calorimetry	Caloric changes as a function of temperature
Thermogravimetric Analysis	Mass loss as a function of time or temperature