Cambrex High Energy

The Cambrex heritage with explosive and hazardous materials dates back to the work of Alfred Nobel at our Karlskoga plant in Sweden. This provides a solid foundation for our cGMP compliant energetic capabilities. Our expertise in this field is also demonstrated at the plant in Charles City, Iowa.

The use of high energy reactions offers you great advantages:

- Shorter synthetic routes
- Cost efficiency
- Fewer by-products
- Better product quality

Process safety - An integral part of your drug development

We have state-of-the-art process safety analysis techniques, extensive in-house safety assessment procedures and rigorous process development capabilities. This results in safe and reliable energetic chemistries in every step from concept to cGMP manufacturing.

In our process safety testing laboratory we use a powerful combination of instruments to provide data of hazard potentials for chemical substances and reaction mixtures.

Safety studies on request

To support your manufacturing or handling of energetic compounds, Cambrex can also perform thermal or process safety studies and consecutive assessments on a consultant basis.

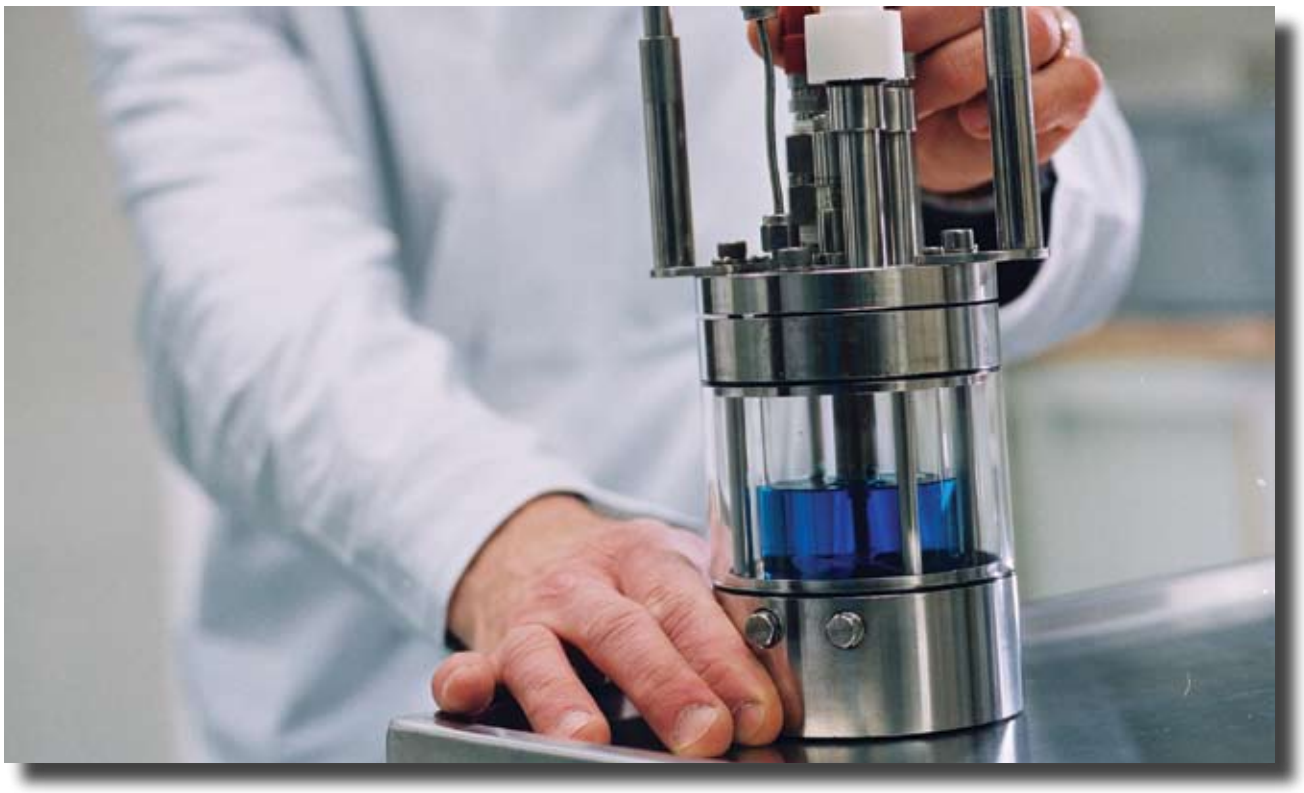
High Energy Expertise

- Nitration with nitric acid
- Catalytic hydrogenations
- Oxidation with nitric acid
- Oxidation with hydrogen peroxide
- Diazotization with sodium nitrite
- Grignard - formation and reaction
- Organic azide formation with sodium azide
- Reduction with LiAlH4
- Lithiation with BuLi/ HexLi
- Sodium hydride as reagent
- Hydroxylamine-HCl as reagent
- High Energy compounds
- High Energy intermediates
- Low thermal stability intermediates
- Hazardous/ toxic chemicals

Our definitions

High energy reaction
Chemical reaction giving an adiabatic temperature rise of more than 200°C.

High energy compound
Chemical compound with an energy of decomposition of more than 1500 J/g.



Equipment

In our process safety testing laboratory we combine the use of Differential Scanning Calorimeter (DSC) and Chemical Process Analyzer (CPA) to provide data of hazard potentials for chemical substances and reaction mixtures.

Differential scanning calorimeter

The DSC is used as a screening tool for thermal properties of all raw materials, reaction mixtures, distillations residues, intermediates and products.

The purpose is to identify any thermal hazard potential of the substances, such as undesirable exothermic decompositions.

Isothermal mode is often used to estimate induction time for reaction systems with autocatalytic behavior.

Reaction calorimeter

The CPA is used to characterize chemical reactions for hazard evaluation and process development. It is mainly used to measure the heat output of primary reactions, but also for thermal stability tests of reaction mixtures, distillation residues and other mixtures of interest.

Data is collected from the isothermal experiments and the reaction enthalpy and the corresponding adiabatic temperature rise are calculated.

Explosion proof box for energetic materials

Reaction mixtures, intermediates or products that show low thermal stability and high energetic properties with DSC may be studied further in an explosion proof box or hood for lab scale experiments.

We have access to micro calorimetry for long-term stability tests, perform Koenen Test, BAM Fallhammer and have BAM Friction Apparatus for sensitivity tests for explosive properties.

Z41 – Process facility in Karlskoga

Our most specialized high energy facility is situated in Karlskoga, Sweden and was originally built for development and small scale production of explosives and substances with explosive properties.

The plant adheres to cGMP for production of APIs and is well suited for the development and manufacturing of thermally unstable products.

The processes can safely be monitored and remotely controlled from a control room situated 50 meters from the plant.

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