

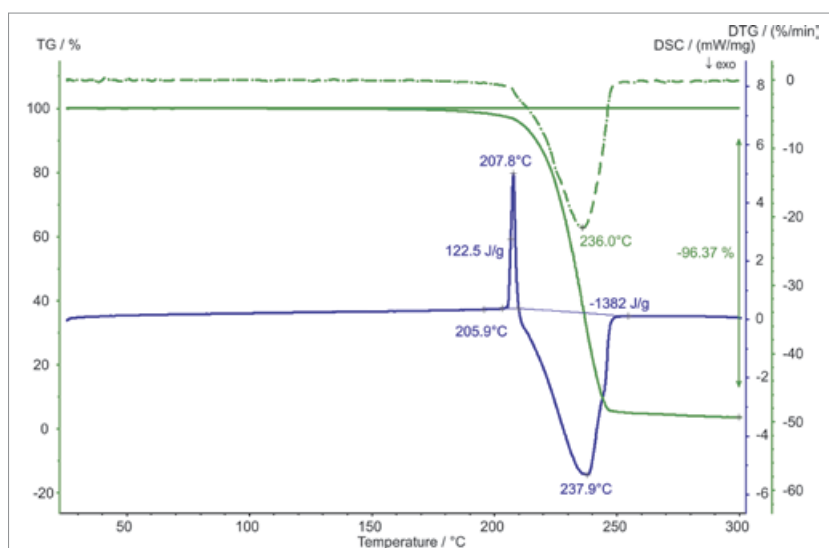
APPLICATION SHEET

ORGANICS/INORGANICS – CHEMICAL INDUSTRY

EXPLOSIVES

An explosive material is a material that either is chemically or otherwise energetically unstable or produces a sudden expansion of the material usually accompanied by the production of heat and large changes in pressure. Typically also a flash and/or loud noise occurs upon the explosion. Explosives usually have less potential energy than petroleum fuels,

but their high rate of energy release produces the great blast pressure. An explosive may consist of either a chemically pure compound, such as nitroglycerin, or a mixture of an oxidizer and a fuel, such as black powder. The development of new and improved explosives requires research and development, for example, using the STA technique.



Instrument

STA 449 **F3** Jupiter®

Test Conditions

Temperature range	RT ... 300°C
Heating/cooling rates	5 K/min
Atmosphere	synthetic air (70 ml/min)
Sample mass	2.32 mg
Crucible	Pt
Sensor	TG-DSC type S

Results

The highly explosive material hexogen (also called RDX, T4, etc.) started to sublime already above 150 °C as can be seen from the TG curve. The endothermic DSC peak at an onset temperature of 206 °C with an enthalpy of 123 J/g is due to melting of the sample. The strongly exothermic decomposition which released an energy of 1.38 kJ/g already occurred between 200 °C and 250 °C. This experiment was carried out in a synthetic air atmosphere at a heating rate of 5 K/min using an initial sample mass of only 2.32 mg.