Thema Safety

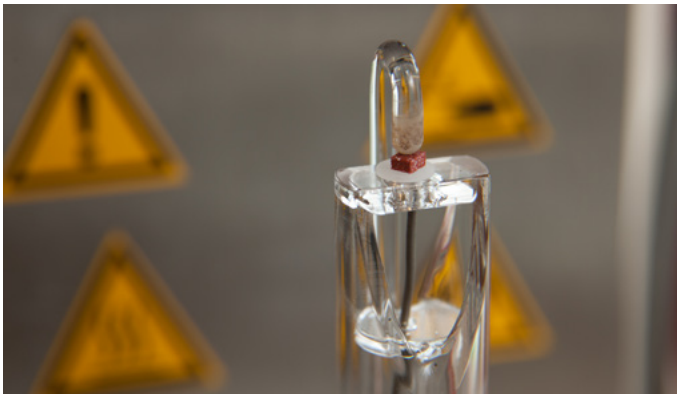
Mechanical Analysis

TNO innovation for life

Several mechanical analysis techniques are available within expertise group Energetic Materials for a wide variety of applications.

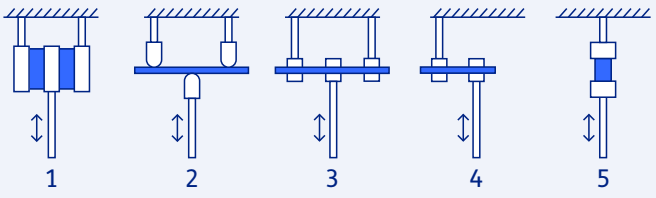
Thermal Mechanical Analysis (TMA)

With TMA a determination of shape change of a sample as a function of temperature (-80 to 450 °C) while the sample is subjected to mechanical stress or force is performed. With this method we can for example determine the Coefficient of Thermal Expansion (LCTE) and glass transition.



Dynamic Mechanical Analysis (DMA)

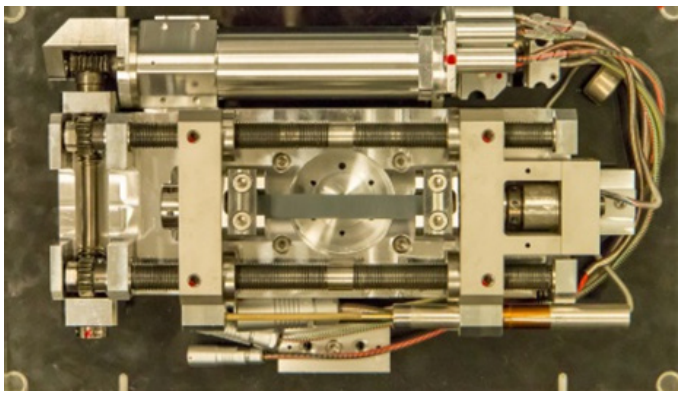
DMA supplies information about mechanical properties of visco-elastic materials, as a function of time, temperature and frequency. The sample is subjected to a periodic (sinusoidal) mechanical stress. This stress causes deformation of the sample which can be measured by displacement. The sample can be loaded in different ways which is shown in the picture below.

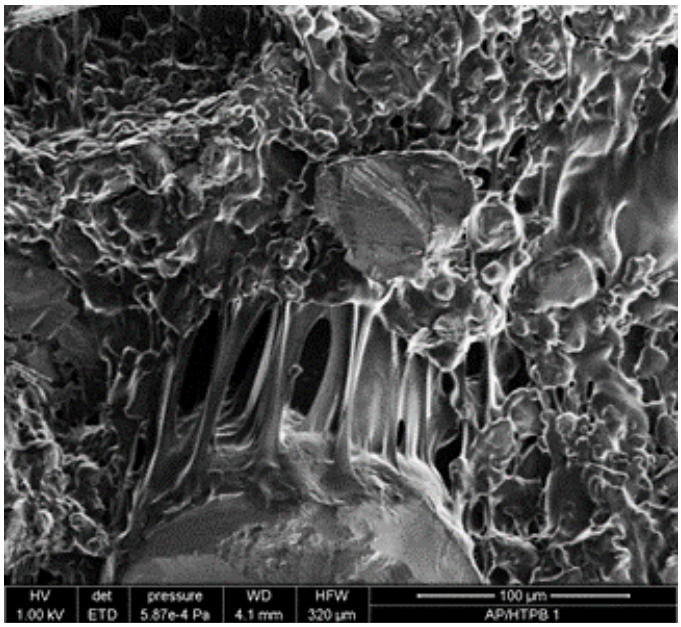


The most important DMA measurement modes
1: shear, 2: three-point bending, 3: dual cantilever,
4: single cantilever, 5: tension or compression.

Tensile and compression module for SEM

A specialized tensile and compression module which fits into the Scanning Electron Microscope (SEM) is available, making it possible to look at your sample on microscope level while it is mechanically loaded. The module can be equipped with a load cell of maximum 1 or 10 kN.





Compression tester

With the compressive test mechanical properties of explosive materials loaded in compression at all strain and loading rates can be determined. Since performance and safety are influenced by the mechanical response of the materials under operational conditions, measurements should be made under conditions as close to operational as possible.

If you see a potential application in one of your project for the use of these techniques please feel free to contact Ellen La Haye (contacts below).

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