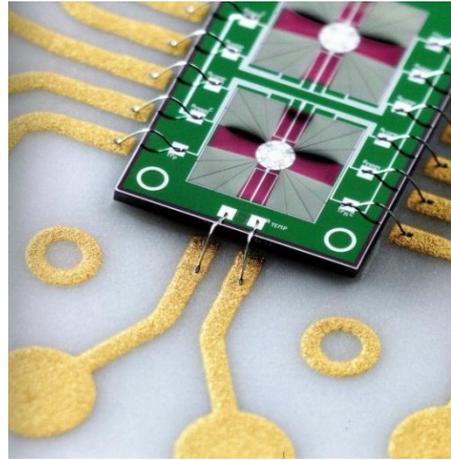


## A revolutionary step forward

All items around us are made of materials that (hopefully) are suitable for the intended use. To certify that the characteristics of these materials are being measured. In technical terms this is called 'material characterization'.

A very important measurement techniques for material characterization is DSC, an abbreviation of 'Differential Scanning Calorimetry'. With this measuring technique both the kind of material ('the composition') and the aggregation state ('the crystallinity') are assessed. The latter largely determines features like visibility, strength and thermal conductivity.



These features, that are important for the use of the material, are influenced by the production method. In particular the physical transactions and the chemical reactions during that process largely influence that crystallinity. Many of these transitions and reactions could until now not be investigated because no instrument was fast enough to measure the corresponding processes. The quickest instruments could 'only' handle heating or cooling rates of 500 °C/min, while during the manufacturing of the products much higher rates, in some situations up to 2,000,000 °C/min, can occur.



For the past few years, three Dutch companies, Anatech from Sittard, Xensor Integration from Delft and SciTe from Geleen, have been developing the technology to challenge the existing speed boundaries. To finance this project, they made use of the arrangement 'Technological Partnership' of (at that time) Senter in The Hague (The Netherlands). This arrangement is to be compared with the current innovation program Point One.



Now this technology is applied in the Flash DSC 1, a commercial available instrument marketed worldwide by the Swiss-American company Mettler-Toledo. Within this instrument heating rates up to 2,400,000 °C/min and cooling rates down to 240,000 °C/min can be achieved. In So, in comparison to existing equipment, the Flash DSC is almost 5,000 times faster. A revolutionary step forward!

The Flash DSC allows users to get access to a complete new world. It enables investigation of applications one previously could not dream off. To mimic the injection molding process of engineering plastics under realistic conditions, to determine more easily the most optimal manufacturing conditions for pharmaceuticals, to safely research high-energetic explosives and to analyze extreme small samples in forensic investigations are a few examples of applications that until now were difficult or even impossible. Because of the introduction of the Flash DSC they are now within reach.

Above all: a measurement of a sample with known DSC's takes typically a half an hour. The very high speeds of the Flash DSC make it possible to conduct many measurements within only a few seconds, generating enormous amounts of new data to evaluate.

The new Flash DSC is an absolute revolution in material characterization!

*Source: NL Innovatie Nieuwsbrief (April 2011)*

*Photo: Mettler-Toledo*



Agentschap NL  
Ministerie van Economische Zaken,  
Landbouw en Innovatie