

MY CHEMICAL ROMANCE Simplifying the world of materials properties

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Currently, manufacturers have high expectations surrounding the performance of their materials. A sealing ring must not become brittle, a PET bottle cannot deform, and medications need to react within the body at exactly the right time. Across the material science domain, Mettler-Toledo's dynamic Differential Scanning Calorimeter (DSC) has become an indispensable tool for many. Thermal analysis makes a valuable contribution from quality control to research and development of materials and chemical compounds. Mettler-Toledo, together with CSEM and ZHAW has developed AIWizard™: An artificial intelligence option for their STAR^e software that will make it easier to interpret DSC curves for thermal analysis.

Thermal Analysis

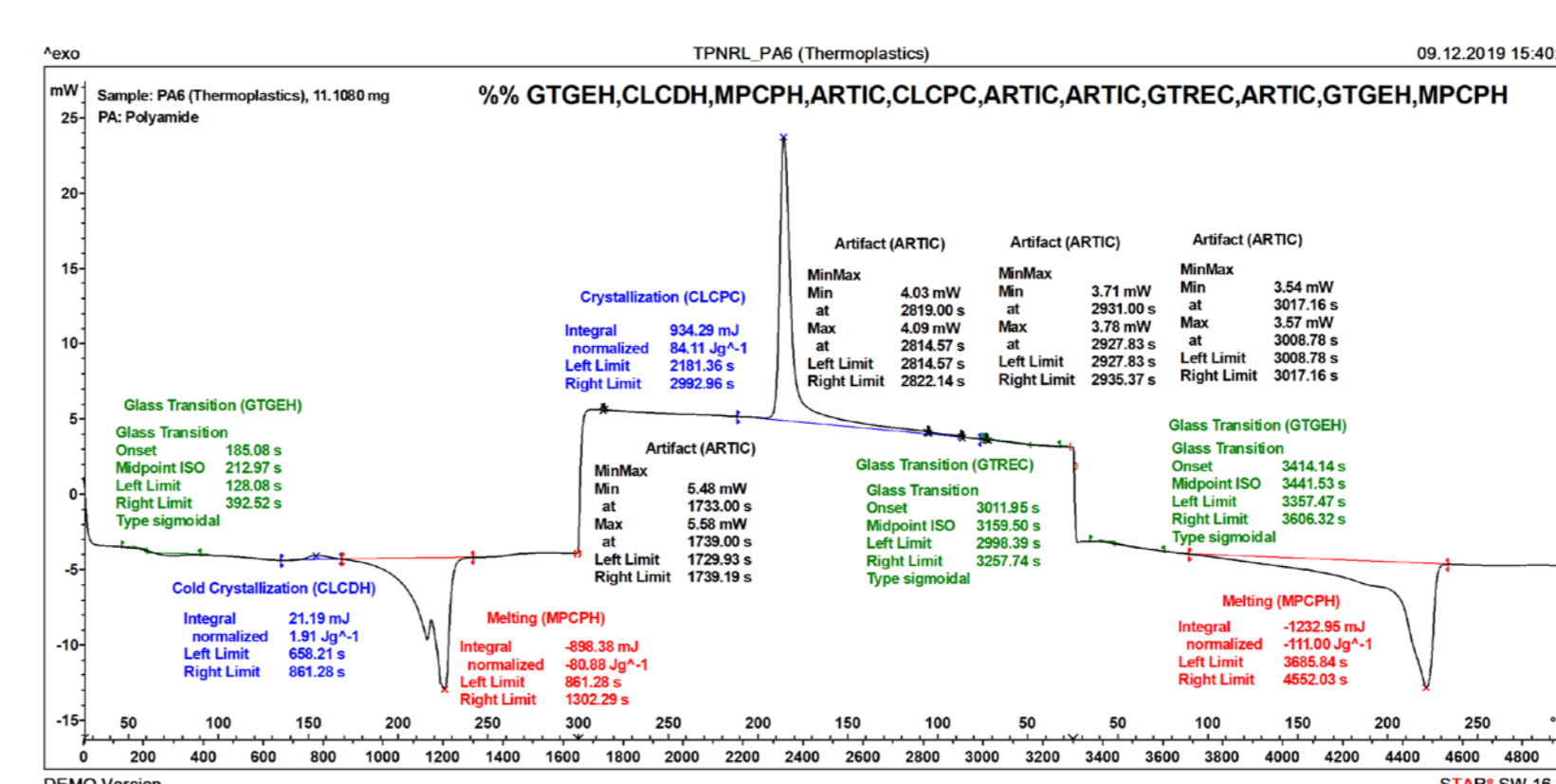
A group of techniques in which a physical property of a substance is measured as a function of temperature whilst the substance is subjected to a controlled temperature program



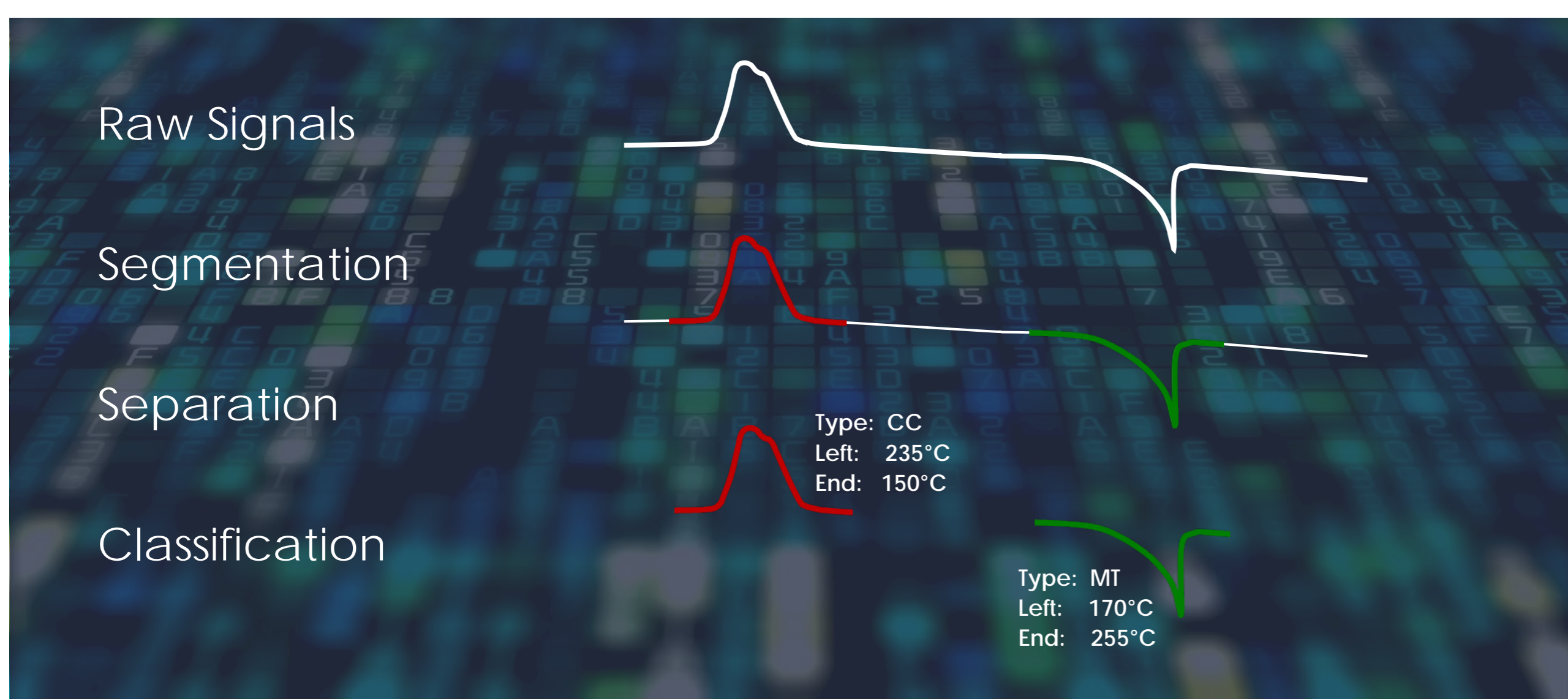
Why do we need DSC?

All materials can absorb or release energy in the form of heat. DSC is used to record physical changes or chemical reactions of materials in quantitative terms by measuring the heat flow of a sample as a function of temperature or time. Application fields:

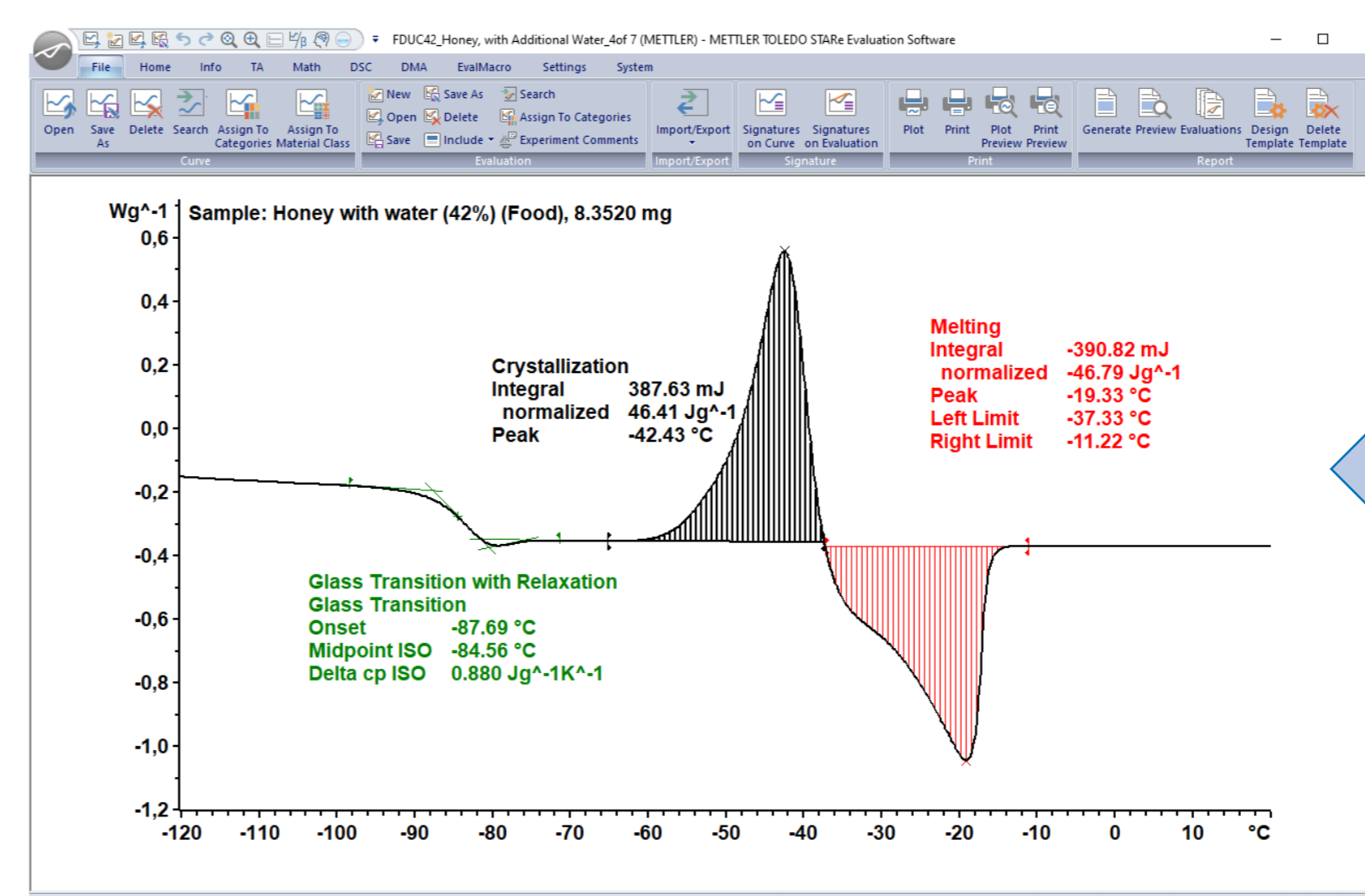
- Quality control
- Research and development
- Failure analysis



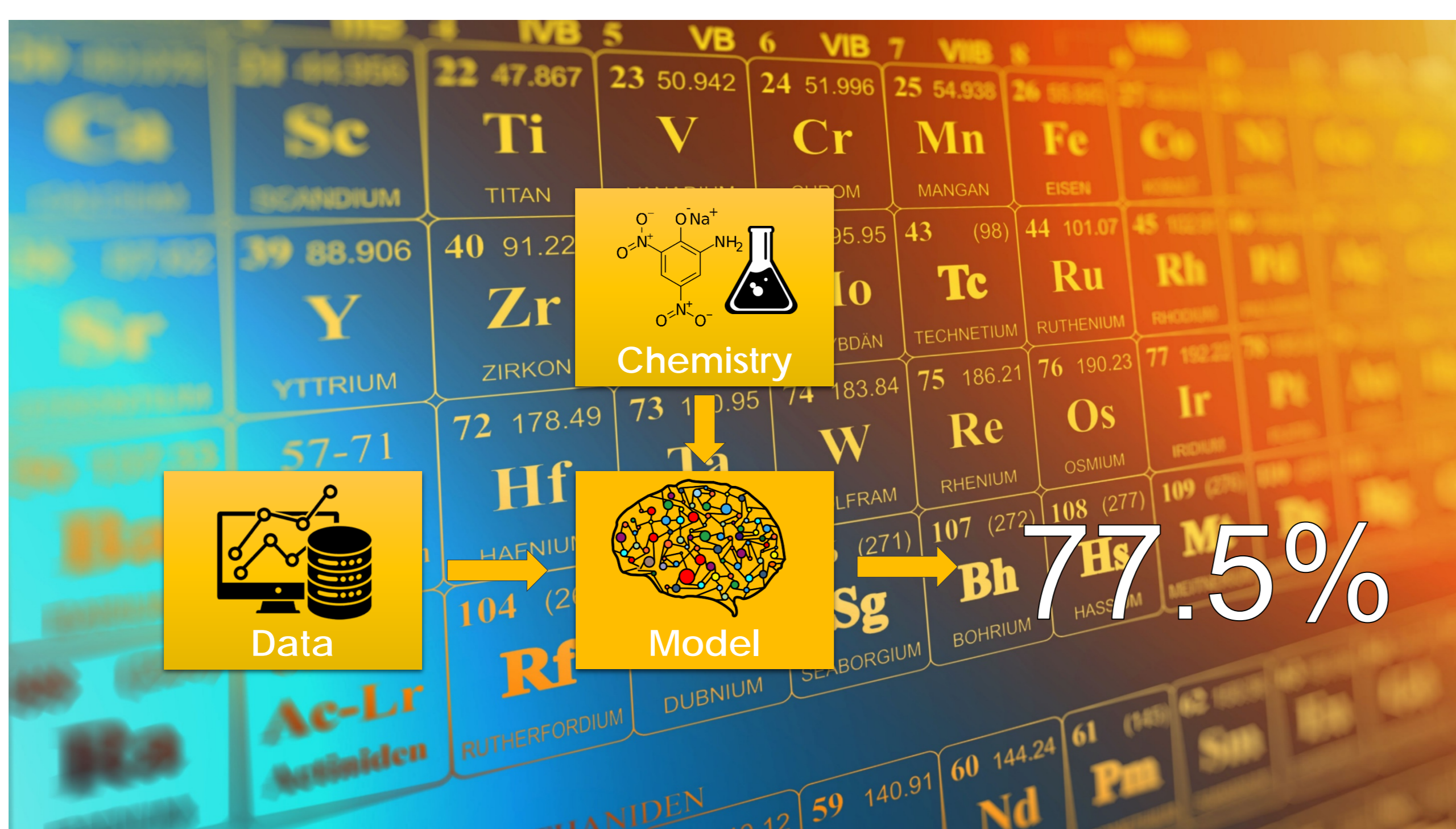
AIWizard™



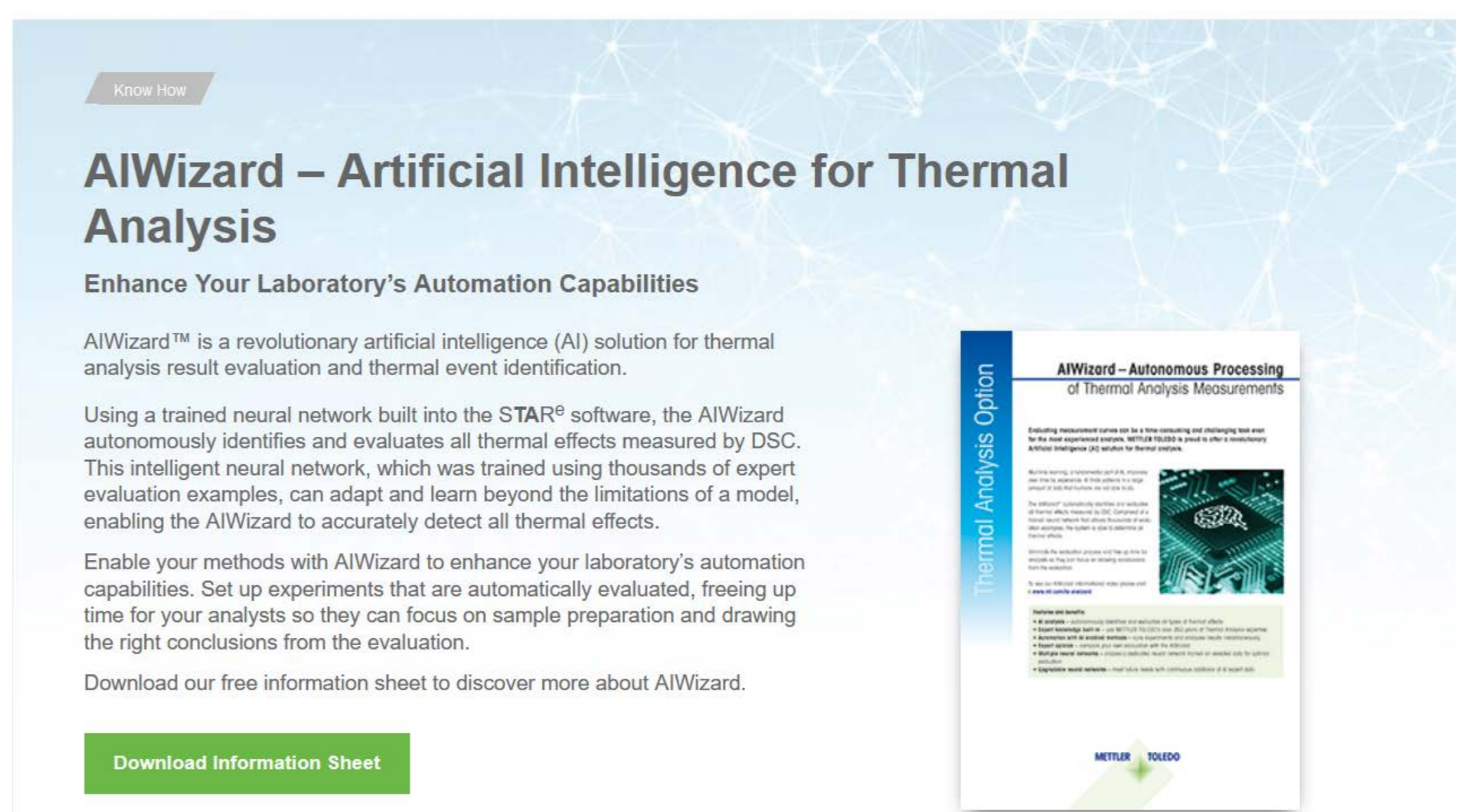
Algorithm Pipeline



Integration into STAR^e Software



Chemistry-Informed Neural Network



Market Launch

The aim was to automate the complex and often error-prone part of the effect determination. Mettler-Toledo contributed its full domain expertise to the project and integrated the AI solution into their software. Additionally, Mettler-Toledo processed a huge volume of expert data for the project based on numerous measurements that had previously been measured for publications and reference libraries. The result of the project is the new software option **AIWizard™**, which has already been integrated into the well-established STAR^e software. It facilitates the fully automated evaluation of thermoanalytical measurement curves of unknown samples.

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