TA Instruments

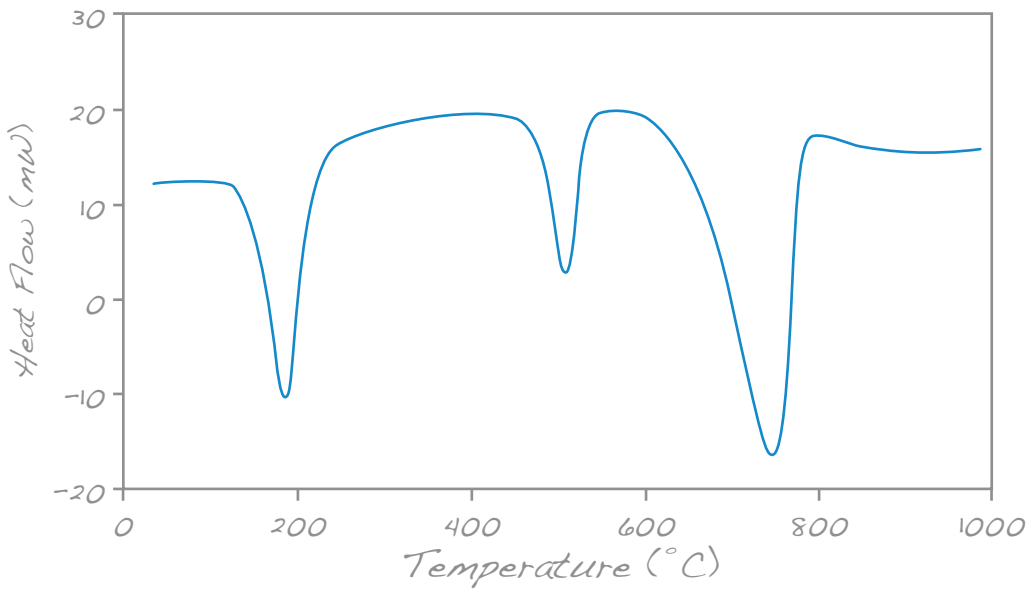
DISCOVER the WORLD'S FINEST SIMULTANEOUS THERMAL ANALYZER

Discover a New SDT System that delivers the

Purest real-time Simultaneous Heat flow and Weight Data Possible

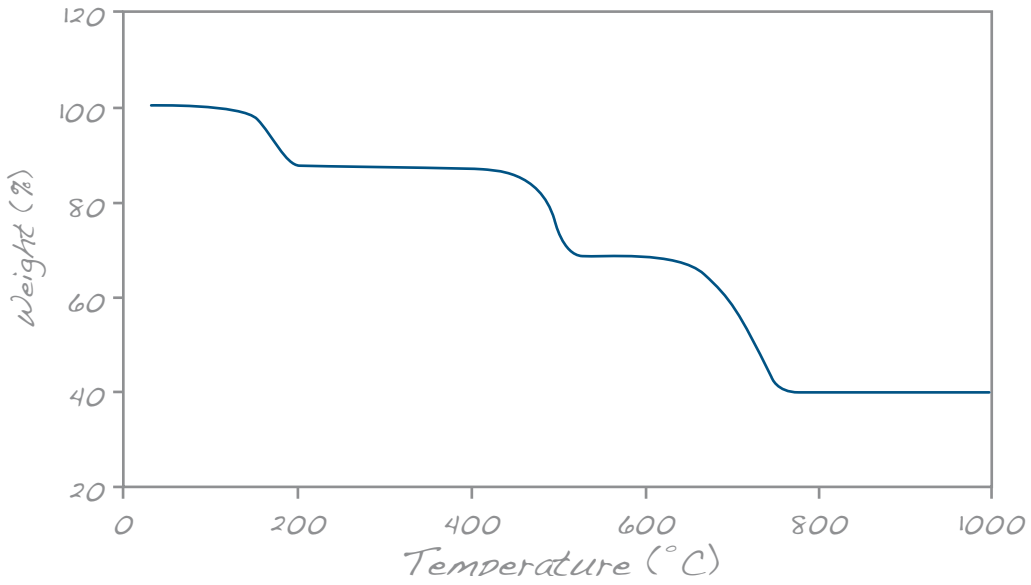
TWO SUPERIOR MEASUREMENTS

DSC

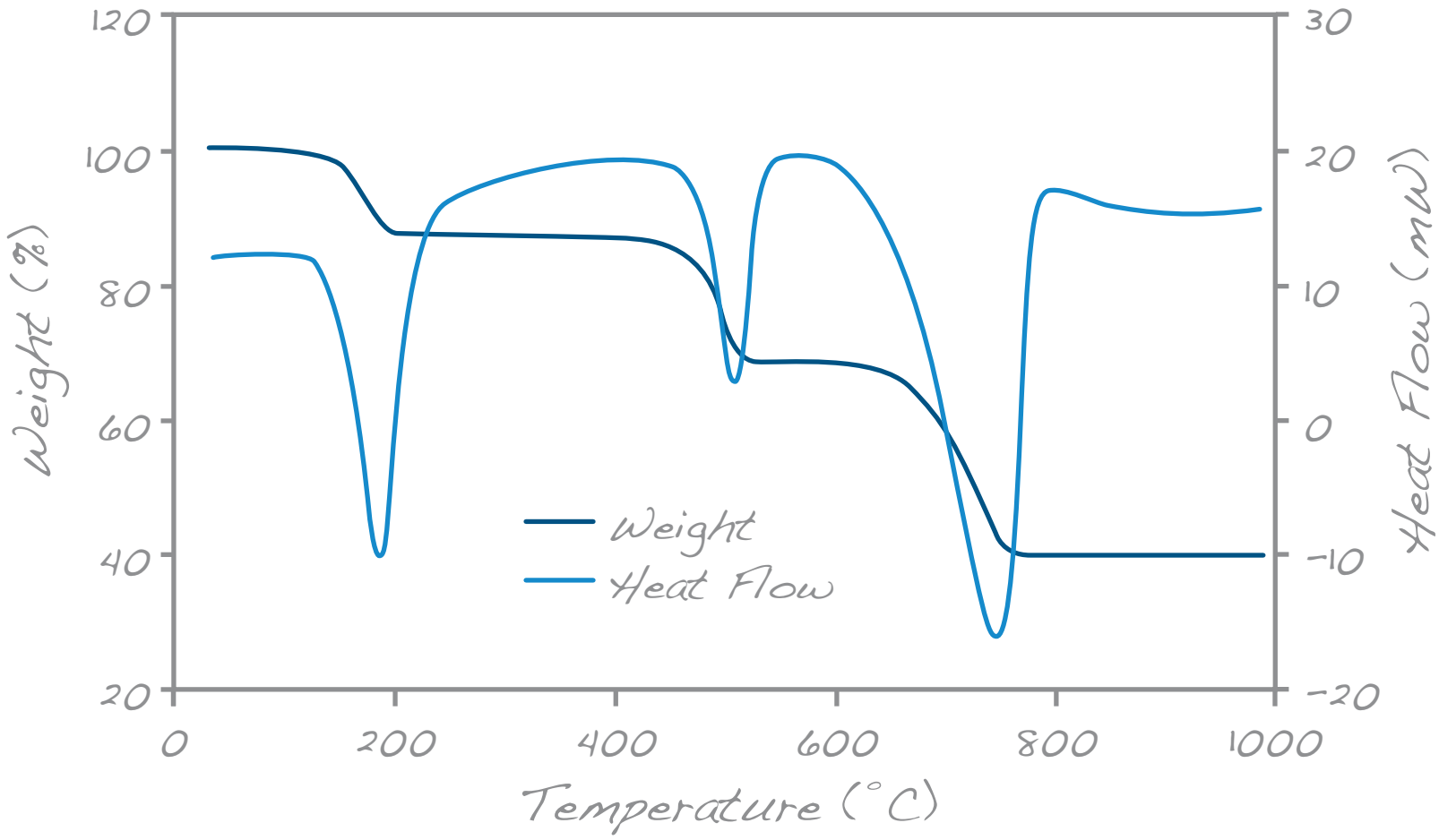


+

TGA



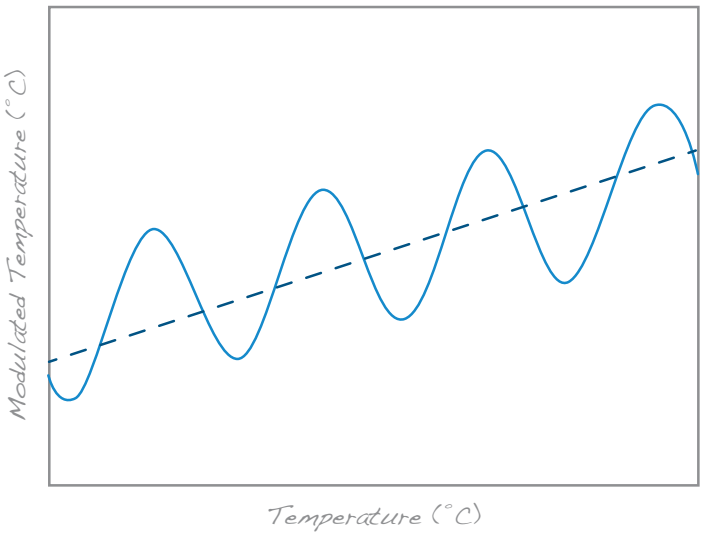
ONE GREAT INSTRUMENT!



PLUS...

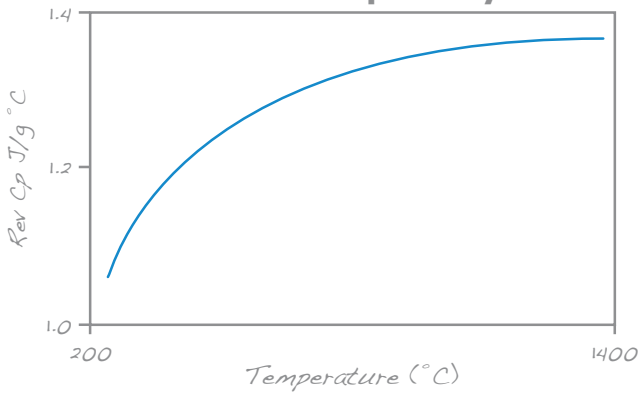
ADVANCED MODES

Modulated Techniques
MDSC® & MTGA™

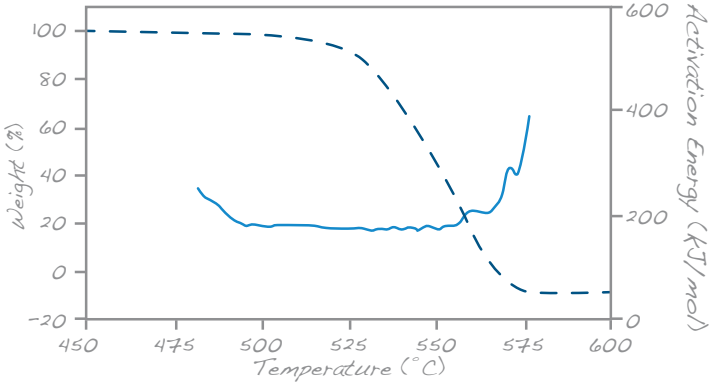


FOR

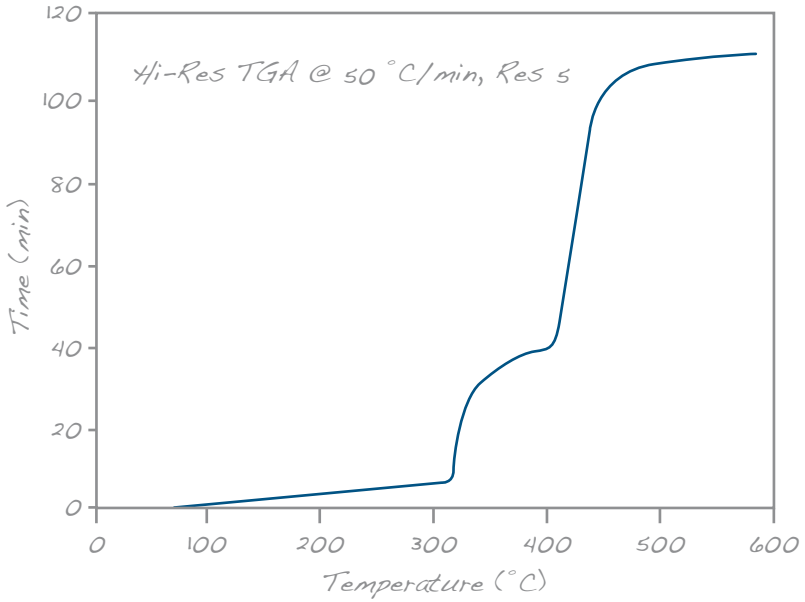
Heat Capacity



Activation Energy

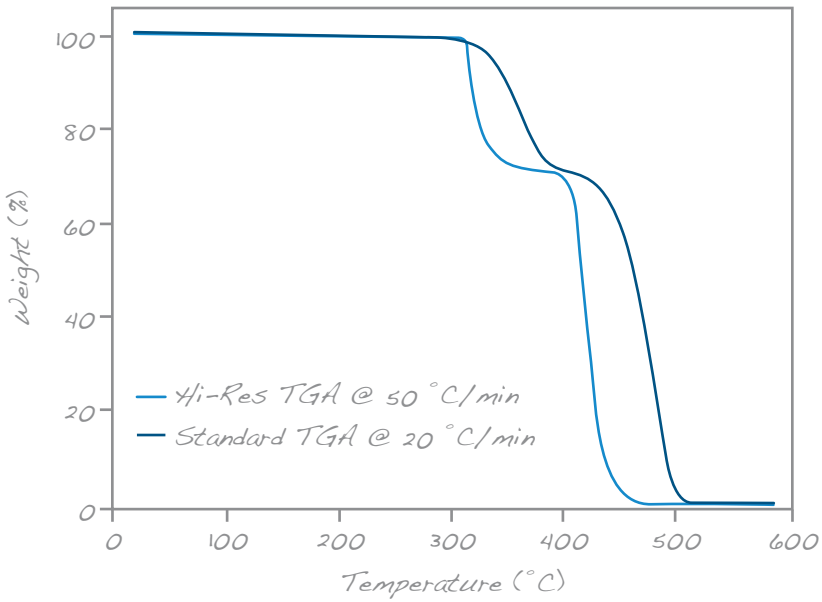


Hi-Res TGA™



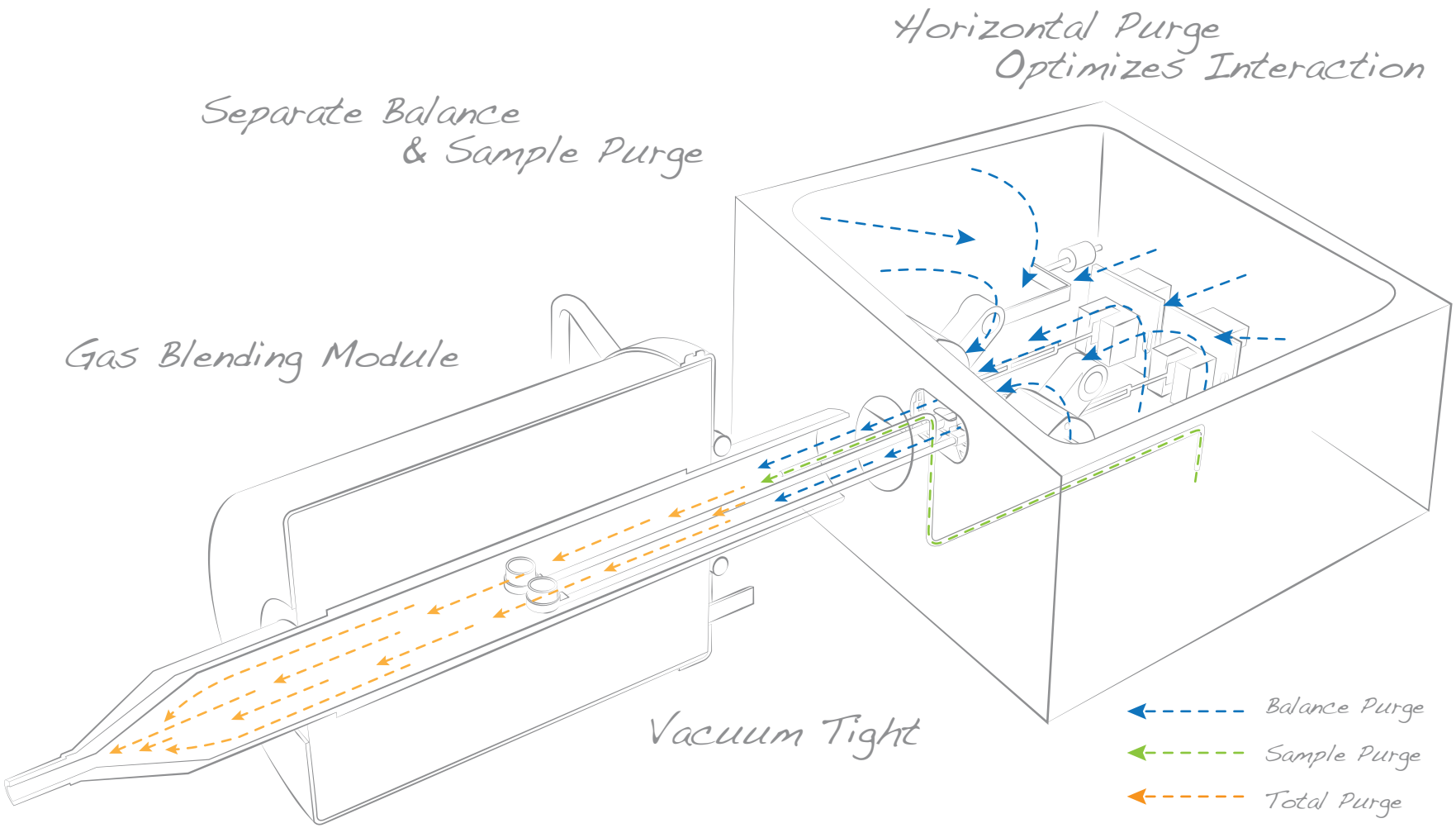
FOR

Better Resolution



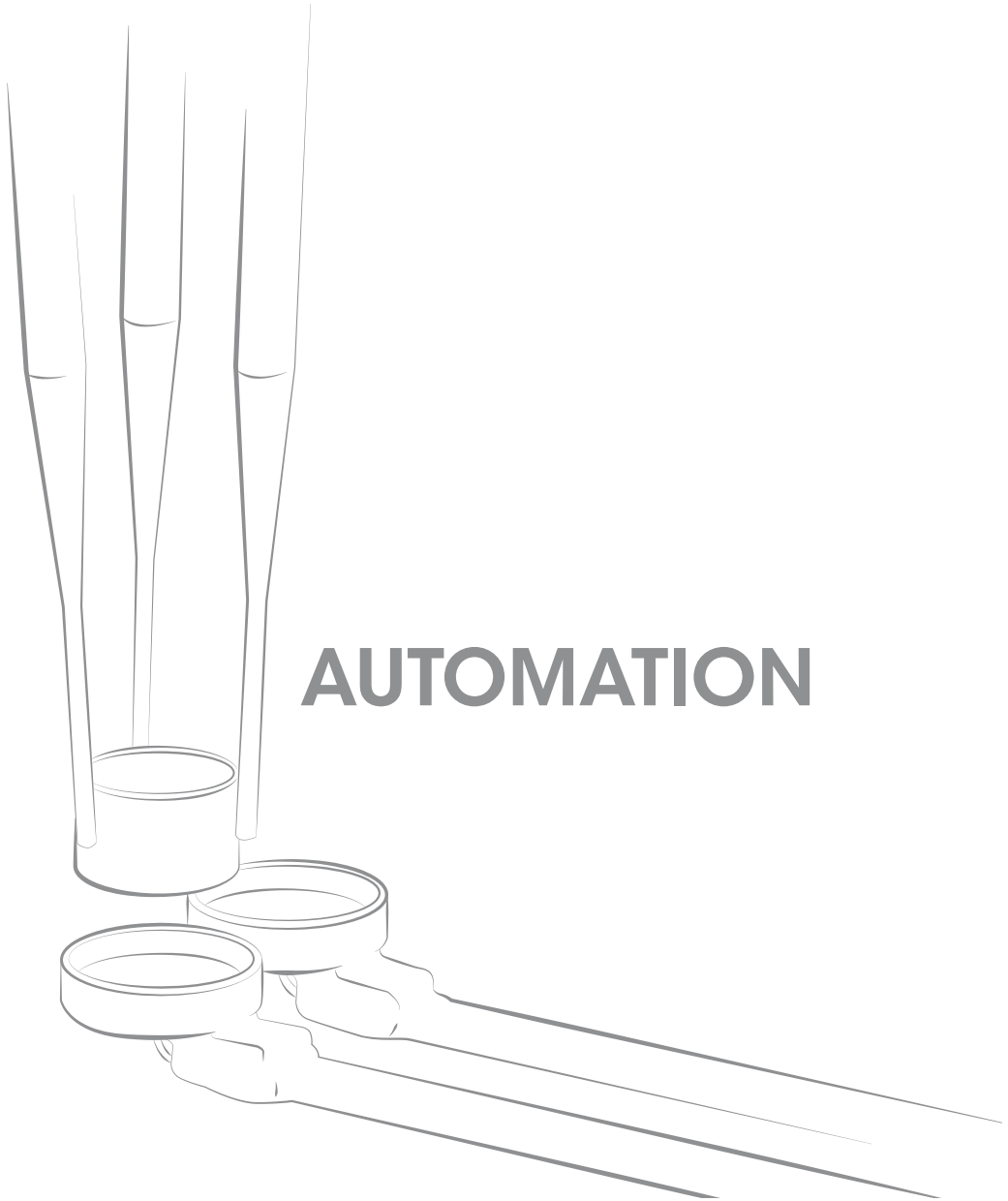
PLUS...

The Most **FLEXIBLE** and **EFFICIENT** **ATMOSPHERE CONTROL**



PLUS...

RUGGED
and RELIABLE



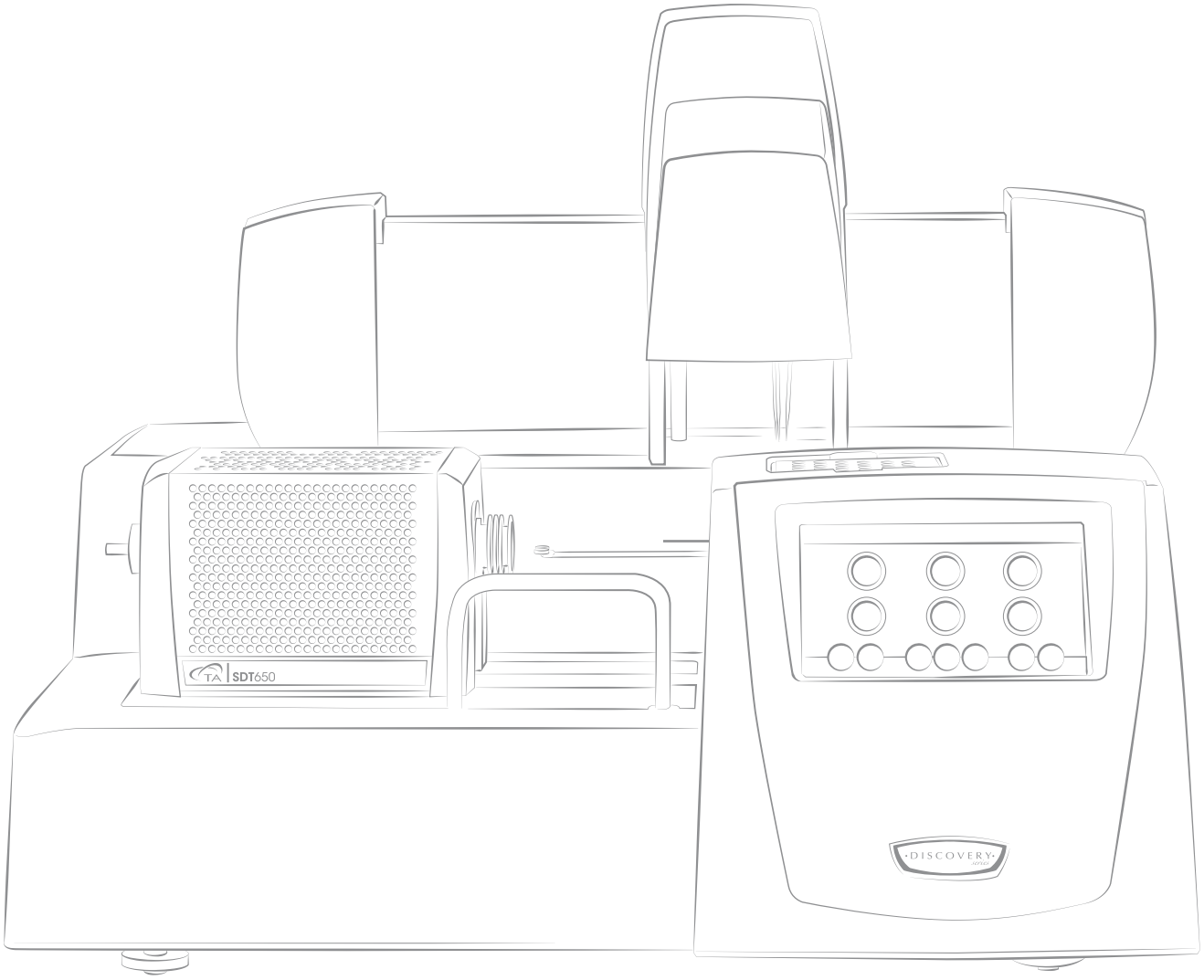
AUTOMATION

WITH...

The MOST VERSATILE CONTROL and ANALYSIS SOFTWARE

EQUALS...

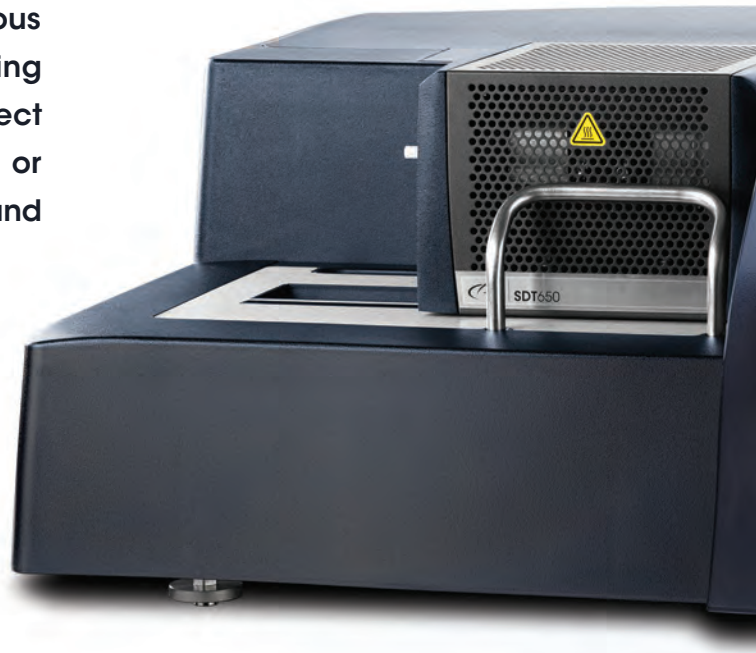
SUPERIOR SDT PERFORMANCE



Discovery SDT

Simultaneous DSC/TGA

TA Instruments invites you to experience the world's finest Simultaneous DSC/TGA, the Discovery SDT 650. Discover the advanced engineering and attention to detail that provides enhancements in every aspect of performance and a new level of user experience. Available with or without an Autosampler, the Discovery SDT is sure to meet your needs and exceed your expectations.



Features and Benefits:

- Horizontal dual-beam design for superior heat flow and weight measurements
- Dual-sample TGA mode for double the productivity of competitive systems.
- Ultra-low drift balance design for unrivaled performance in baseline flatness, sensitivity, and resolution.
- Modulated DSC®, (MDSC®), for the best determination of heat capacity
- Hi-Res™ TGA for the best separation of overlapping weight losses
- Modulated TGA™, (MTGA™), for increased productivity for studying kinetics
- Reliable linear autosampler with programmable tray positions for worry-free 24/7 operation, most flexible programming of experiments, and automated calibration and verification routines
- New innovative "app-style" touch screen puts instruments functionality simply One-Touch-Away™ , enhancing usability and making it easier than ever to get great data
- Commitment to quality backed by the industry's ONLY five-year furnace warranty for peace of mind

TA remains as the only thermal analysis instrument supplier to ensure the utmost in data integrity through thoughtful and innovative design. Industry-leading performance is realized without the need for lengthy pre- and post-test data manipulations prevalent in competitive offerings. The new Discovery SDT provides both novice and advanced users the highest confidence on generating superior data, while enhancing laboratory workflows and productivity.


SDT650
Status: Idle
21.44 °C
SYSTEM INFO
SIGNALS
SETTINGS
METHOD
UTILITIES
DISCOVERY
SDT650
SDT650
Status: Idle
21.50 °C
SYSTEM INFO
SIGNALS
SETTINGS
METHOD
AUTOSAMPLER
UTILITIES
DISCOVERY

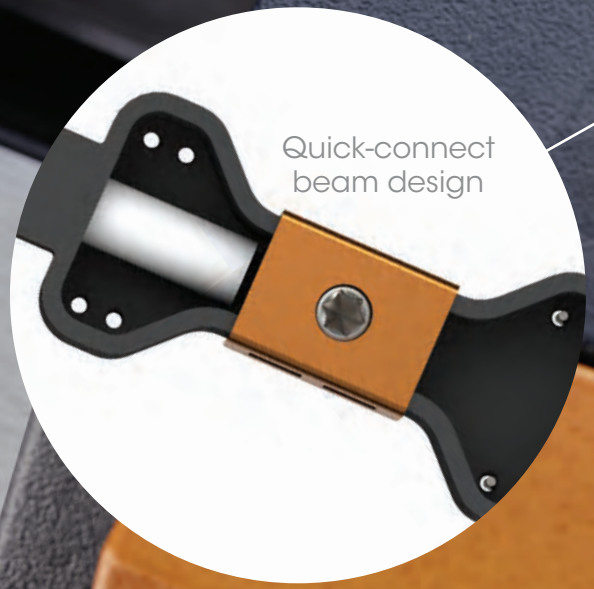
Horizontal Dual-Beam Thermobalance

At the core of every new Discovery SDT is the exclusive TA horizontal dual-beam thermobalance. The integrated thermocouple design within the ceramic beams provides direct sample, reference and differential temperature measurements. This ensures superior DSC and TGA performance and unlike competitive designs, the SDT 650 gives this performance without requiring baseline subtractions and other post-test manipulation.The result is an innovative new SDT with unrivaled performance in weight drift, sensitivity and simultaneous DSC AND TGA measurements.

Dual-Beam Thermobalance Features and Benefits:

- Ultra-low drift balance design ensures accurate detection of even the smallest weight changes
- Simultaneous TGA/TGA - Our unique dual-sample mode permits independent TGA measurement simultaneously for double the productivity of any other TGA.
- Dual-beam design makes heat flow measurements intrinsically superior to that of single-beam designs.
- Quick-connect beam design with integrated pop-up beam support makes changing beams as simple as turning a screw, ensuring maximum productivity and ease of use.

QUICK and **EASY BEAM REPLACEMENT** ensures **MAXIMUM UPTIME**



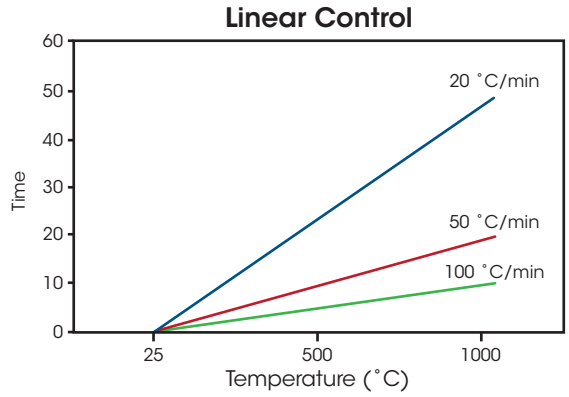
Quick-connect
beam design

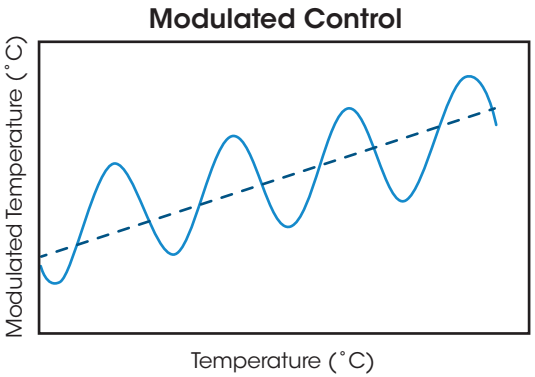
Technology

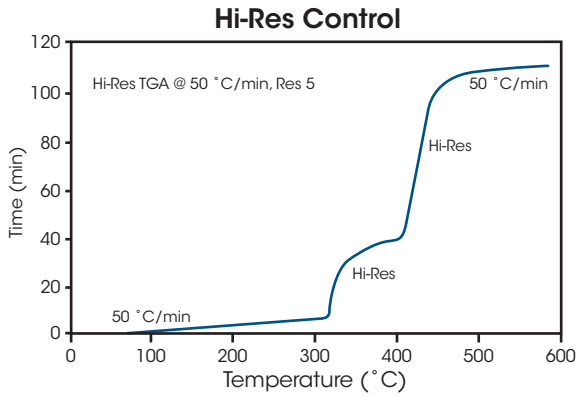
Furnace

VERSATILE & DURABLE FURNACE for LONG LIFE

Every furnace on Every system is designed and manufactured by TA specifically for high performance DSC AND TGA measurements. This durable horizontal furnace offers better temperature uniformity than competitive systems.







- Ambient to 1500°C with a wide range of heating rates for maximum flexibility in experimental design.
- Horizontal design for excellent evolved gas results without chimney effects of competitive systems.
- Cooling from 1500 °C to 100 °C in under 40 min for quick sample turnaround.

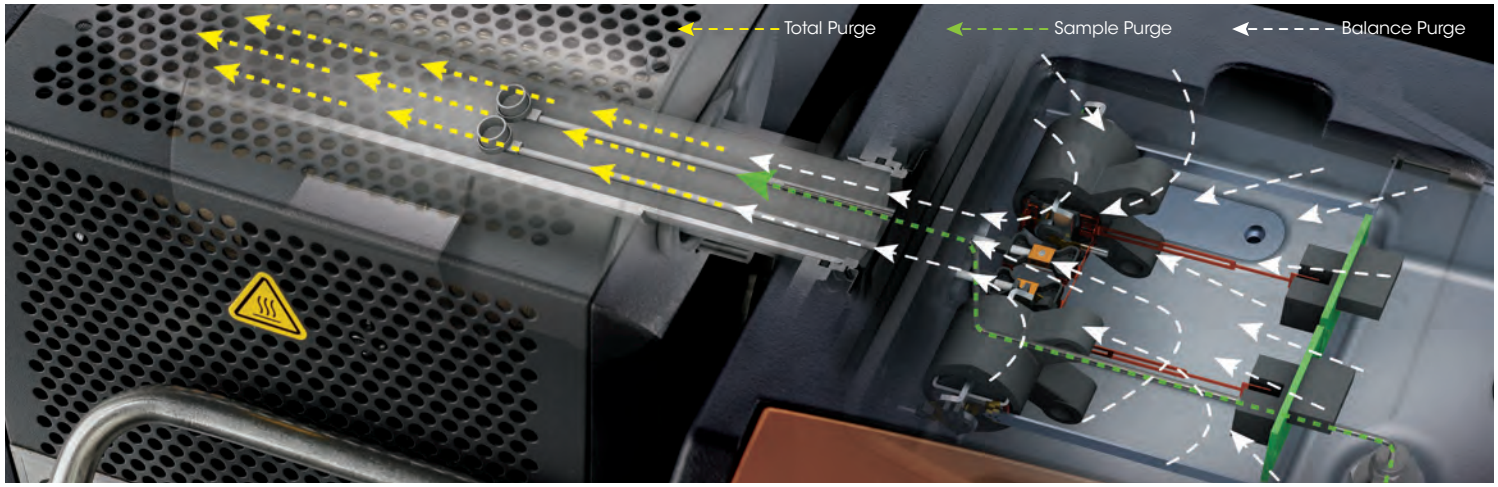
All TA furnaces are covered by the industry's ONLY 5-YEAR WARRANTY

Atmosphere Control

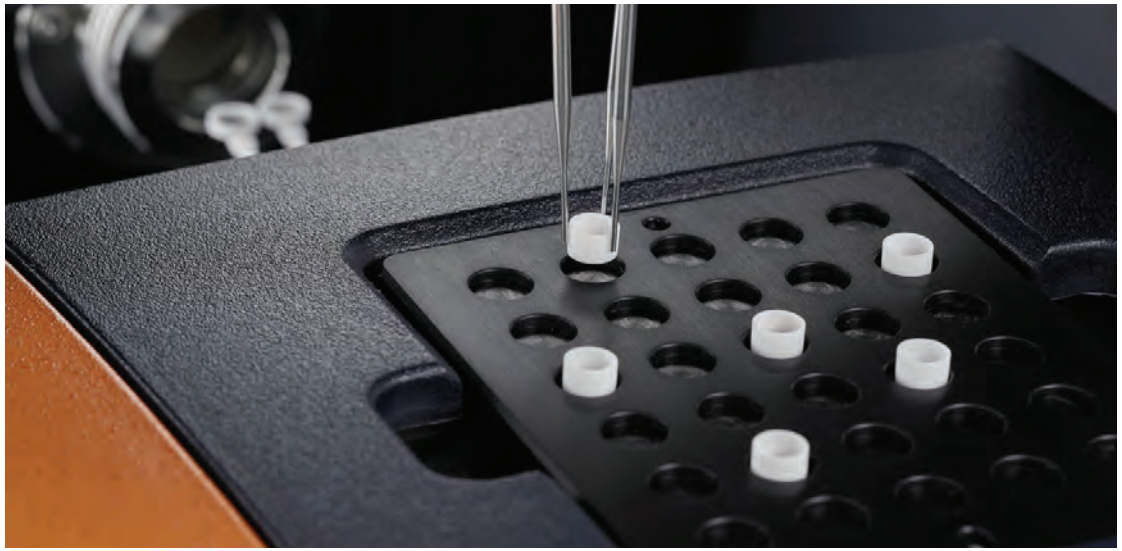
Discovery SDT's are designed with superior atmosphere control to meet the most demanding applications. Whether maintaining an inert atmosphere, switching to an oxidative purge, or maintaining a high vacuum the Discovery SDT is up to the task.

Atmosphere Control Features and Benefits:

- Innovative Gas-Delivery manifold design minimizes potential leak points from tubing and hardware connections ensuring the most consistent, repeatable atmosphere.
- Integrated software-controlled gas switching for experiments requiring dynamic or reactive atmospheres
- New Gas blending and switching module allows inputs of up to 4 gases for flexibility and widest range of applications
- Separate balance and sample purge ensures efficient gas switching and minimizes purge times
- Horizontal design for optimal purge gas/sample interactions and superior evolved gas measurements
- Vacuum tight to ensure inert, oxygen-free atmospheres



The most **EFFICIENT**
SAMPLE-ATMOSPHERE INTERACTION



The NEW Discovery SDT features our 30-position autosampler to optimize productivity. Based on our proven Discovery DSC design these rugged autosamplers are cycled extensively in our factory to ensure worry-free operation.

Autosampler Features and Benefits:

- Scheduled and unattended experiments, calibrations and verifications give scientists more time for research.
- Innovative dual-sample mode doubles throughput over any other TGA.
- New TRIOS software makes it easier than ever to manage and run a large and diverse sample queue. The Design view and Running queue allow for quick and efficient autosampler programming.
- For optimum flexibility, sample and reference pans may be assigned to any combination of the available 30 positions.

Technology

"APP" Style Touch Screen

One Touch Away™

Touch Screen Features and Benefits:

- Ergonomic design for easy viewing and operation
- Packed with functionality to simplify operation and enhance user experience. The apps-style touch screen includes:
  - Start/stop runs
  - Real-time signals
  - Active method viewing
  - Autosampler calibration
  - System information
  - Test and instrument status
  - Real-time plot
  - Advance method segments
  - Loading/unloading and taring pans

The app-style touch screen, powerful new TRIOS software, the robust and reliable autosampler with automated calibration and verification routines all work seamlessly to dramatically improve laboratory workflow and productivity.

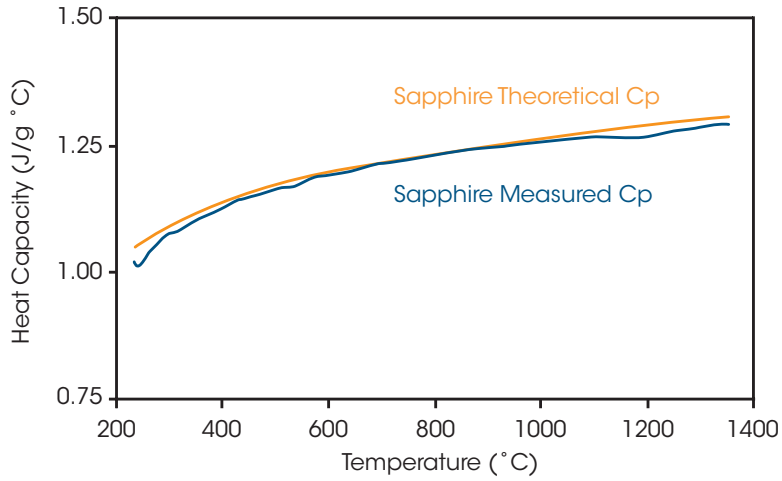
ITS NEVER BEEN EASIER TO GET GREAT DATA!

DISCOVER more about your MATERIALS

In TA Modulated DSC, a sinusoidal temperature oscillation is overlaid on the traditional linear ramp. The net effect of this on a DSC/TGA instrument is that Heat Capacity (Cp) can be measured directly in a single run. TA invented MDSC and understands it like no other company. Modulated DSC is standard on EVERY Discovery SDT model.

Benefits of MDSC include:

- Direct measurement of heat capacity in a single run.
- Most accurate and repeatable measurement of Cp up to 1500 °C.
- Can measure changes in Cp isothermally to look at structure changes vs time.

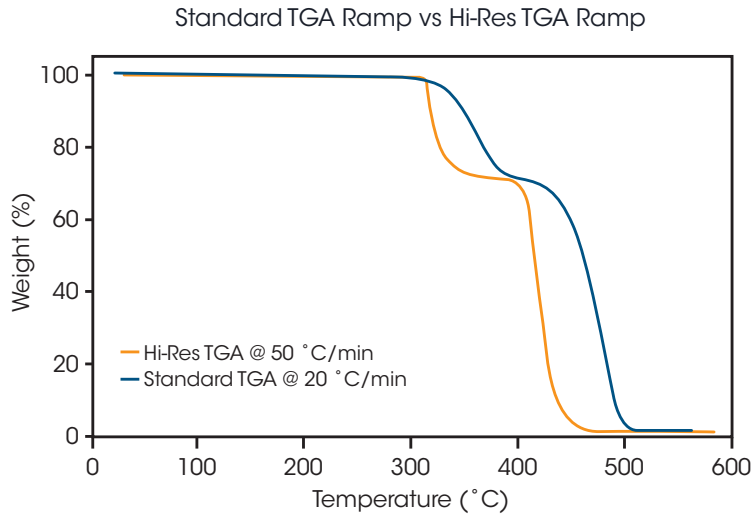


* U.S. Patent no. 6.113.261 and 6.336.741

In Hi-Res TGA the heating rate is controlled by the decomposition rate of the sample. The Discovery SDT 650 design is ideal for these measurements with a furnace designed for precise temperature control, and sensitive thermobalances designed to quickly detect small weight changes.

Benefits of Hi-Res TGA include:

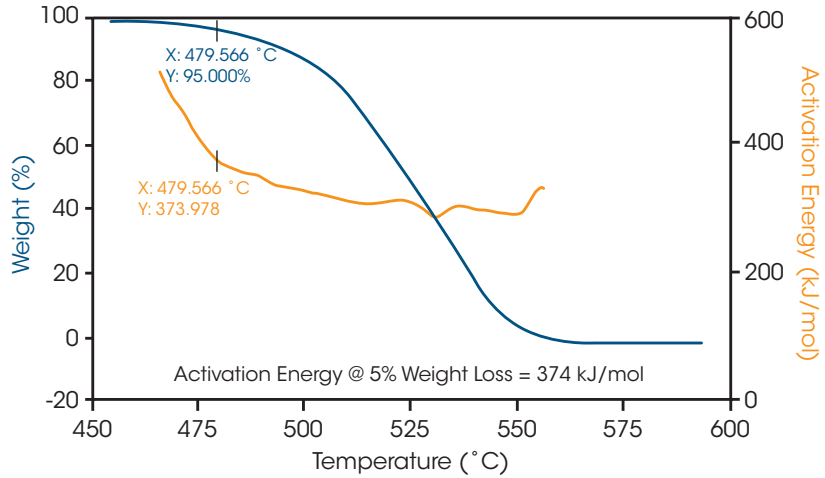
- Separation of broad and overlapping weight losses.
- Increased productivity with better resolution.
- Rapid survey over wide temperature range with excellent resolution.
- Simple method setup.



TA's patented MTGA™ is another TA Instruments innovation that offers advantages for material decomposition studies. Developed from the proprietary heater control technology utilized by Hi-Res TGA and MDSC, MTGA produces model-free kinetic data. Activation energy can be calculated real-time and studied as a function of time, temperature, and conversion.

Benefits of MTGA TGA include:

- Increased productivity for studying kinetics.
- Model-free kinetic data.
- Can be combined with Hi-Res for better separation of overlapping weight losses.
- Direct measurement of activation energy.



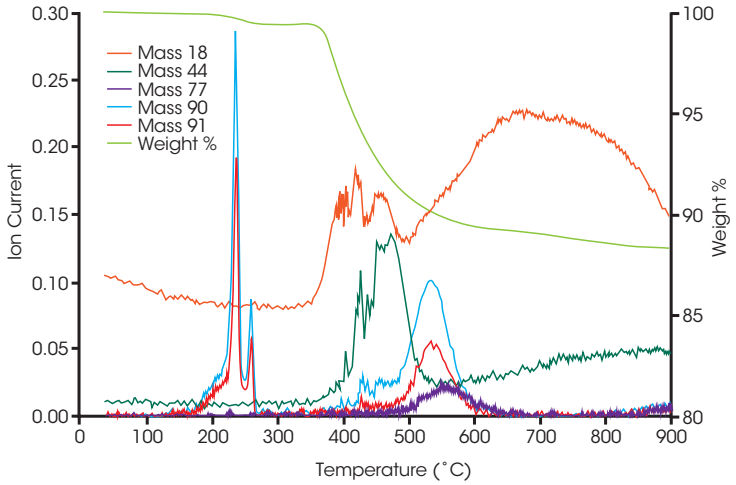
Technology

Evolved Gas Analysis

Evolved gas analysis involves the qualitative investigation of the evolved gas products from an SDT or TGA experiment. These products are generally the result of decomposition, but can also evolve from desorption, evaporation or chemical reactions. Evolved gas analysis is typically performed by interfacing a mass spectrometer (MS) or Fourier transform infrared spectrometer (FTIR) to the exit port of the furnace. Through the use of a heated transfer line, the evolved gas stream is delivered to the MS or FTIR instrument, and the compositional analysis is performed in real time. TA Instruments offers a 300 amu bench-top, quadrapole mass spectrometer with a heated capillary interface, with an instrument specific interface kit. A variety of FTIR suppliers provide gas cells and interfaces.

The Discovery SDT is the ideal platform for evolved gas analysis studies. A horizontal purge stream over the sample and a short path to the exit port eliminates dead volume in the furnace, thereby reducing product dilution and optimizing EGA sensitivity.

TA Instruments TRIOS software supports the importation of MS (trend analysis) and FTIR data (Gram-Schmidt and Chemigram reconstructions), allowing DSC/TGA and EGA data to be displayed on a common axis of temperature and/or time.



EGA Features and Benefits:

- Identification of decomposition products.
- Additional information for the interpretation of the reactions during DSC/TGA scans.
- Exact control of the furnace atmosphere before and during experiments.

Design Features and Benefits of the Discovery SDT for EGA Analysis:

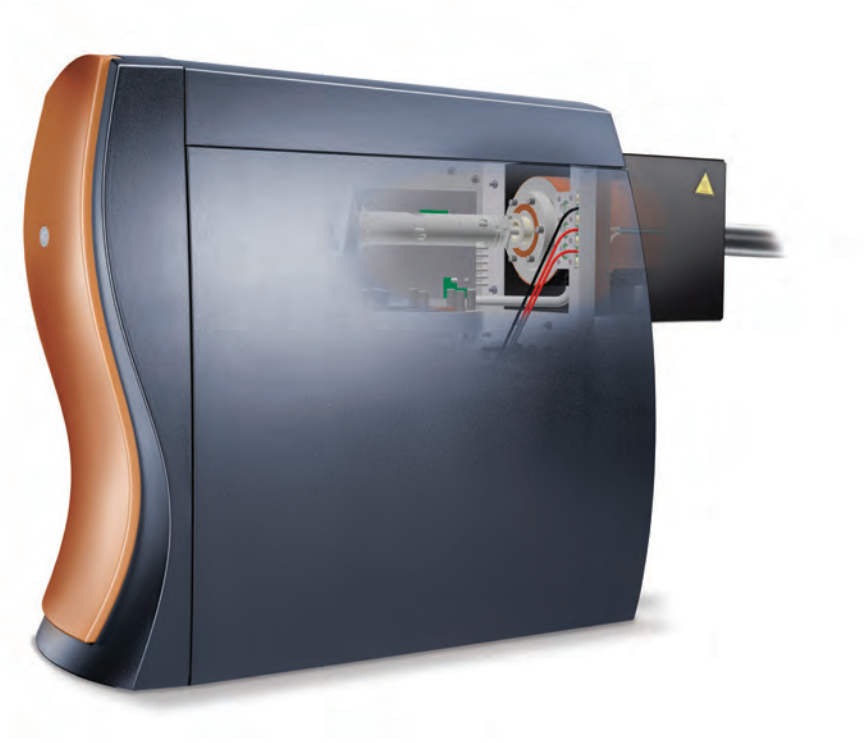
- Horizontal purge stream over the sample for optimal sensitivity.
- Low volume furnace to eliminate dead volume, reducing dilution.
- Powerful TRIOS software allows importation of MS or FTIR data for improved data interpretation.

Discovery Mass Spec

The Discovery MS is a benchtop quadrupole mass spectrometer, designed and optimized for evolved gas analysis. It features industry-standard technology configured for the efficient transfer and rapid detection of offgas from the TGA furnace. Parts per billion (ppb) sensitivity is ensured with our state-of-the-art quadrupole detection system, including a closed ion source, a triple mass filter and a dual (Faraday and Secondary Electron Multiplier) detector system.This analyzer configuration is selected to optimize sensitivity and long-term stability performance.

Control of the experimental parameters and analysis of the mass spectral data is achieved through a user-friendly, recipe-driven software interface. Data collection can be triggered directly from the TGA software, and the resulting MS data can be combined with the corresponding TGA results for direct overlaying and comparison.

Parameter	Performance
Mass range (amu)	1-300
Mass Resolution	>0.5 amu
Sensitivity	< 100 ppb (gas-dependent)
Ionization Source	Electron Ionization
Detector System	Dual (Faraday and Second Electron Multiplier)
Sample Pressure	1 atm (nominal)
Data Collection Modes	Bargraph and Peak Jump
Scanning Speed	
Bargraph Mode	>50 amu/s
Peak Jump Mode	>64 channels/s
Transfer line Temperature	300 °C (fixed)
Transfer line	1.8 meters, flexible
Filaments	Dual, customer changeable
Capillary	Stainless Steel, changeable
Capillary size	I.D. = 0.22 mm
Inputs	Data collection controlled by TGA Trigger



Features & Specifications

Features

Standard

- Modulated DSC
- Hi-Res TGA™
- Modulated TGA™
- Dual Sample Mode
- Auto-Stepwise TGA
- Color App-Style Touch Screen
- EGA Furnace Capable
- Dual Input Gas-Delivery Manifold
- Temperature Calibration Curie Point (ASTM E1582)
- Temperature Calibration Melting Point Standards

Options

- 30-Position Autosampler
- 4-Gas Blending Module
- TGA/MS Operation
- TGA/FTIR Operation

Specifications

Temperature Range	Ambient to 1500 °C
Dynamic Temperature Precision	±0.5 °C
Heating Rate (Linear)	0.1 to 100 °C/min
Calorimetric Accuracy/Precision	±2% (based on metal standards)
Heat Capacity Accuracy	±5%
Sample Weight Capacity	200 mg
Weighing Accuracy	±0.5%
Weighing Precision	±0.1%
Weight Baseline Drift[1]	<50 µg to 1000 °C & <50 µg 1000 to 1500 °C
Vacuum	50 µTorr

[1] Without baseline subtraction

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