



Ebatco Nano

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Nano Brief

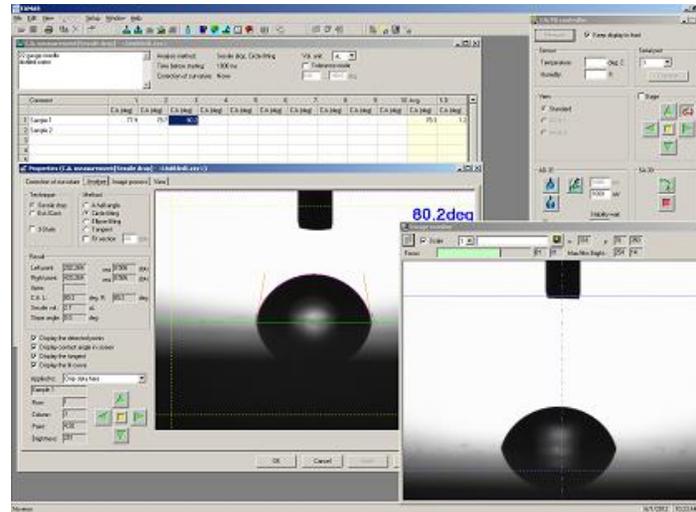
“Nano has always been here – in concrete, mud – the difference is that in the last 20 years we started to see it, now we have the instruments. Everything is nano and we can use nanoparticles to extend the limits. Nanotechnology will bring us to another world.”

-Jan Prochazka, chief executive of Advanced Materials-JTJ

Ebatco

We understand that not everyone has the convenience to travel to our lab and see an instrument demonstration in person. For those that do not have the time, but still wish to see a particular instrument, we offer live demos via Skype. With Skype, we can provide a demonstration of an instrument’s performance through a web cam over the internet. This way, the instrument can be observed without the need to be physically in our lab. In addition, any questions about the instrument or test sample that arise during the demo can be addressed instantly.

A handy feature of Skype is the share screen function. With this function, Skype transmits a live feed from the computer desktop similar to the screen capture below. Sharing the screen via Skype provides a clear, real time view of the analysis and the instrument’s operational software regardless of web cam capabilities. All of the instruments in our NAT Lab can be used for demo via Skype. If you have any interest in seeing any of our instruments in action or knowing more about our analytical lab services, please feel free to contact us. We can set up a live web demonstration for you today.



Screen capture of the FAMAS, the program used to control Kyowa Contact Angle Meters.

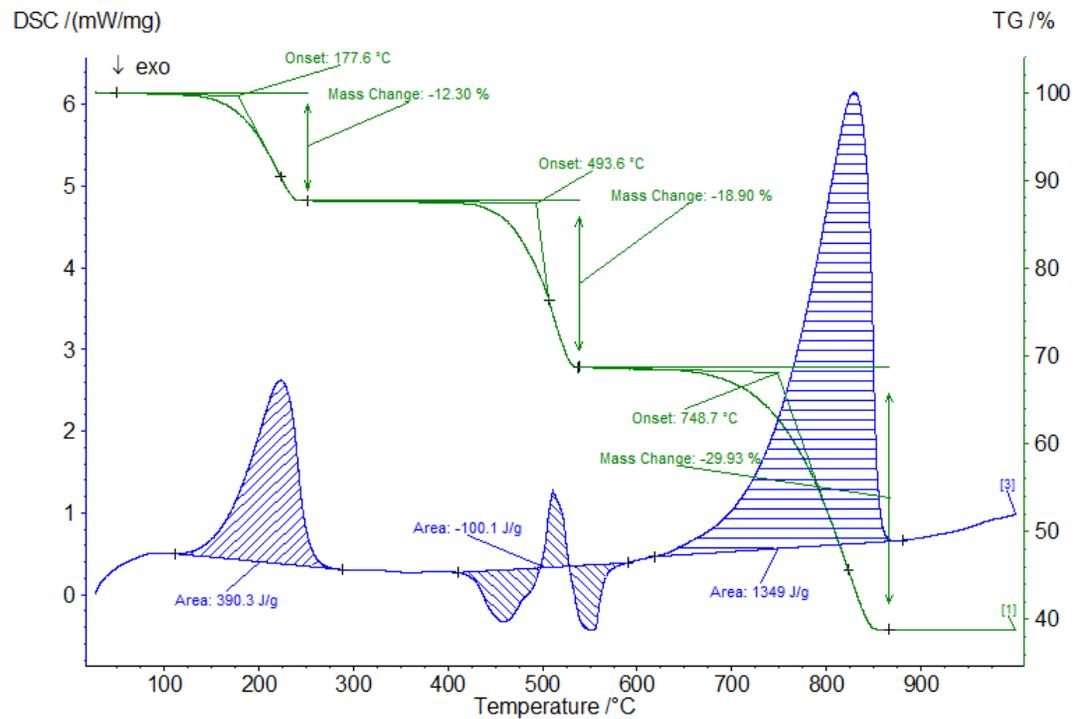
For your quick reference, below are some of our lab capabilities that you can request:

- Advancing and Receding Angle
- Contact Angle
- Differential Scanning Calorimetry
- Dynamic Mechanical Analysis
- Flat Surface Zeta Potential
- Fracture Toughness
- Interfacial Tension
- Micro Contact Angle
- Micro/Nano Hardness
- Micro/Nano Scratch
- Modulus Mapping
- Nano Compression
- Nano Wear Testing
- NanoDMA Testing
- Particle Sizing
- Pore Size Analysis
- Residual Stress Analysis
- Simultaneous Thermal Analysis
- Sliding Angle
- Specific Heat
- Static and Kinetic Friction
- Surface Free Energy Analysis
- Surface Roughness
- Thermogravimetric Analysis
- Thermomechanical Analysis
- Wear Resistance
- Zeta Potential of Particles

Case Study

Finishing out the thermal testing capabilities of Ebatco's NAT Lab is the Simultaneous Thermal Analysis (STA) capabilities of the Netzsch STA F3 Jupiter (Germany). The STA allows for the simultaneous measurement of Differential Scanning Calorimetry (DSC) and Thermogravimetric Analysis (TGA). By running both DSC and TGA at the same time, STA allows for better correlation between the changes in energy and mass since the run conditions are the same. STA is useful in applications such as differentiating between phase transformations, identifying decomposition temperatures and observing combustion reactions. Any material that undergoes changes in mass or internal energy when heat is applied can be analyzed by STA.

As an example, Calcium Oxalate Monohydrate, $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$, was analyzed with the STA F3 Jupiter. Calcium Oxalate exhibits three distinct decomposition stages as heat is applied. These stages can be seen as events in both the TGA and DSC signals. As seen below, the TGA signal (green) shows the percent of mass loss due to decomposition and the decomposition temperature at each stage. The DSC signal (blue) shows the change in energy occurring during the decomposition stages. It is interesting to note that a combination of endothermic and exothermic reactions occur during the second stage in the DSC signal. This can be explained by the Boudouard reaction, an equilibrium redox reaction where carbon monoxide forms carbon dioxide and carbon.



DSC and TGA results for the decomposition of Calcium Oxalate Monohydrate.

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