Thermal Analysis System

Thermo plus EVO

—Combining Safety and Performance—

1. Introduction

The Thermo plus EVO series is Rigaku's new line of thermal analysis instrumentation, offering advanced safety features, easy operation and versatile performance.

The standard thermal analysis techniques are TG-DTA, for the evaluation of heat resistance properties and component analysis of complex materials; DSC, for measuring melting, crystallization, crystalline transformation or glass transition; and TMA, for the assessment of the thermal expansions or thermal changes accompanied by change in dimension or form. The Thermo plus EVO series provides an instrument for each of these techniques.

2. Background of the development

Thermal analysis sees wide use in a range of applications, from research and development to quality control. It is an essential technique for obtaining fundamental data on the thermophysical properties of materials.

As instrument user skill levels are becoming more diverse, development of the Thermo plus EVO series put an emphasis on ensuring that anyone can acquire consistent measurement results—maintaining stability and ease-of-use. The instruments were designed on the concept of combining safety features with ecologically sound ideas.

3. Versatile features

Using these design principles as a base, the new features of the Thermo plus EVO series can be summarized in 5 categories: **Stability**, **Ease-of-use**, **Safety**, **Environment** and **Maintenance**.

Stability

- Temperature calibration
- Energy calibration
- Balance calibration
- Data protection

Ease-of-use

- LAN connectivity
- Control up to 8 instruments from 1 workstation
- Information-rich control panel
- Automatic sample-changer

Safety
- Fully covered electric furnace
- Enhanced safety interlock mechanism
- Sample pan alert

Environment
- Eco Mode (low power consumption)
- User-specifiable auto-sleep, auto-shutdown

Maintenance
- FirstAid troubleshooter
- Easy firmware update

Details are provided below.

Stability

By reimagining conventional thermal analysis technology using advanced circuit design techniques, we have created an instrument that is more reliable and more intelligent than its predecessors. The EVO series features industry-leading self-diagnostic and auto-calibration functionality.

If the connection to the workstation is severed, a conventional thermal analysis instrument will suffer from data loss. With the EVO series, the measurement continues and the data is saved.

Ease-of-use

The Thermo plus EVO series introduces LAN-based network connectivity to Rigaku thermal instruments. The previous generation allowed up to 3 instruments to be controlled from a workstation. A single Thermo plus EVO workstation is capable of controlling up to eight instruments.

Because the workstation and the instrument are connected through a LAN, it is possible to schedule and control measurements remotely. In the past, measurement control and data analysis were both done on the PC connected directly to the instrument. Two licenses for the data analysis software are included with the standard system, making it possible to analyze measurement data at two different locations. Combining the two licenses and the remote connectivity, work efficiency can be greatly increased.

For the EVO TG-DTA and DSC instruments, as many as 24 samples can be loaded into the automatic sample changer, SmartLoader. The SmartLoader can also be used to automate reference sample changes.

Safety

In a conventional thermal analysis system, the electrical furnace is exposed, increasing the risk of injury. The Thermo plus EVO has a fully covered furnace, making the instrument safer.

Also, even though if the user does not have extensive training and experience, the instrument can still be used with the highest safety. With respect to modularity, the maximum operational temperature can be regulated through the limiter function. With the error protection function, it provides all types of protection, minimizing human error. For example, a pop-up warning message will automatically appear when an inappropriate sample pan is used within a given temperature setting.

Environment

The Thermo plus EVO is the first environmentally-friendly thermal analyzer with ECO power-saving mode. In ECO mode, all fans stop, the display indicators turn off and the CPU clock speed is lowered, reducing stand-by power consumption.

Maintenance

The Thermo plus EVO utilizes an advanced automatic diagnostics system. In the event that a problem occurs, the FirstAid troubleshooter will recommend the best way to proceed.

It is possible to update analyzer firmware through the PC, making analyzer upgrades quicker and easier than ever before.

Other features

Graph data across multiple axes (humidity, pressure or oxygen); simultaneous multi-plot graphs are essential tools for the examination of reactions such as pharmaceutical hydration or hydrogen-occlusion alloy storage.