

TGA-PTR-TOF-MS

The RJ Lee Group TGA-PTR-TOF-MS Combination is the Latest Generation of Enhanced Gas Analysis Instrumentation

The TGA-PTR-TOF-MS combines an off-the-shelf thermogravimetric analyzer (TGA) that can raise the material in the heating chamber to temperatures as high as 600°C. The combination of the TGA with the PTR-TOF-MS allows for the real-time chemical characterization of the emissions from material of interest in 1-second increments; tracked compounds of concern are unlimited in number but have an upper mass limit of $m/z=400$. Since the PTR-TOF-MS aims to perform analysis of fragile compounds without full fragmentation, the instrument is set to run at a maximum of 110°C/230°F and even lower for vacuum applications. Heating the sample to higher temperatures requires the dilution of the gases with UHP-nitrogen to avoid condensation. The RJ Lee TGA-PTR-TOF-MS is a fully automated system and operates based on pre-defined heating protocols. The results include the VOC concentrations, the change of mass of the material and the temperature of the heating chamber. An ongoing development is the next generation analytical platform, using a vacuum heating chamber within the TGA. This novel analytical tool of low pressure (LP) TGA-PTR-TOF-MS will be used primarily for surface evaporation studies, where the actual temperature is purposely held low to separate surface phenomena from structural decomposition of the base materials.

	TGA-FTIR	TGA-MS	TGA-GC/MS	TGA-PTR-MS	LP-TGA-PTR-TOF-MS
REAL-TIME ANALYSIS					
HIGH SENSITIVITY					
HIGH SPECIFICITY					
HEAT SENSITIVE ANALYSIS					

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Key Advantages



Wide range of target compounds



No loss of information due to gas chromatograph



Real-time analysis; results are instant



Higher accuracy



High resolution mass spectrometry for increased specificity (TOF)



Less heat needed to simulate off-gassing; keep your prototype intact (LP mode)



Examples of Applications for the TGA-PTR-TOF-MS Emission Testing

- PPE (nitrile gloves, latex gloves, surgical masks)
- Building and automotive materials (spray-on foam, heat and soundproof materials)
- Silicon fittings and pumping oil on respirators
- Rubbers from commercial tire shredding

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