

NEWSLETTER

LPD Lab Services

TEL: +44 (0)1254 676 074

One-Stop Shop for Industrial Process Problem Solving, Consulting and Routine Analysis

Welcome to the Summer 2022 edition of LPD Lab Services newsletter.

LPD Lab Services are the experts in materials, chemicals, technical engineering and scientific problem solving for products and processes across all sectors within Quality, Facilities, Manufacturing, Engineering, Development and Research and Reverse Engineering.

LPD Lab Services continues to develop innovative analytical solutions for in-process manufacturing, finished products and for development of new products and materials. We pride ourselves in resolving fascinating technical problems from across the UK and the wider world.

Our service to scientific and engineering solutions are core to our business model!

- Electronic and Battery Testing
- Lead in Paint Testing - UKAS Accredited Method
- Thermal Analysis - DSC and TGA
- Thermal Desorption - GC-MS Analysis
- R&D Analytical Labs

Electronic and Battery Testing

Electronic components/devices are increasingly relied upon in everyday life in products, devices, applications, automobile and even going into space. By understanding the build quality, contamination problems and failure mechanisms, manufacturers will be able to deliver greater reliability, endurance and performance from the electrical components.



LPD Lab Services recently attended Battery Cells & Systems Expo at the NEC, Birmingham and listened to the debate on developing and recycling batteries. LPD have experience in evaluating the quality or physical failures within batteries and electronic systems and use a variety of analytical techniques to scrutinise components, materials, surfaces and welds / joints. It involves reverse engineering aspects of the processing to solve product, process and service life instability problems particularly in lithium ion cells. LPD also provide services to ensure recycled products are quantified to provide the highest quality.

However, a key factor in understanding a finished product/electronic component is how it can be dismantled without destroying or contaminating the target area for investigation or characterisation.

The art of this dismantling and cutting takes years of skill to perfect and maintain the sample integrity which sets up the sample to be



Once dismantled, samples are then prepared for combinations of techniques such as optical microscopy, SEM/EDX, FTIR, XPS, GC-MS and XRD. By looking across different analytical techniques our scientists and engineers can gain a greater in depth scientific picture and provide greater insight and evidence to aid the understanding of processes and improvements strategy.

Dr Stephen Jenkins, Principal Scientist / Managing Director and Dr Simon Romani, Development Director are strong advocates of using multiple techniques to prove

the scientific and materials engineering history and provide pragmatic advice how to improve battery products performance and life.

Lead in Paint Testing - UKAS Accredited Method

LPD Lab Services are a UKAS accredited lab, number 2766 for lead in paint as well as other tests including pH, conductivity and anions in water. The lab is audited regularly by UKAS to ensure standards are met and quality system is compliant.

The last UKAS reassessment audit was passed in early 2022. Our trained staff have many years of experience in preparation, analysis by Atomic Absorption Spectrometry (AAS) and reporting the findings.

This can be a rapid turnaround service to meet clients needs for infrastructure and facilities projects like housing, commercial offices, factories, bridges or refurbished housing. For a speedy response, Contact LPD staff directly for Lead in paint analysis.



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Thermal Analysis - DSC and TGA

Thermal analysis are a group of techniques with precision controlled temperature programs that allow the quantification of changes in material properties (chemical and physical) with temperature. The two techniques that complement each other are Differential Scanning Calorimetry (DSC) and ThermoGravimetric Analysis (TGA) and are used to analyse pharmaceuticals, medical devices, plastics, rubbers, adhesives, sealants, resins or other organic materials as well as glass fibre and carbon fibre reinforced composites in organic materials and liquids.

Differential Scanning Calorimetry (DSC) is a thermal analytical technique where a temperature program shows the amount of heat energy required to increase the temperature of a sample and show changes in the chemical state within the sample.

DSC can provide information about physical phenomena, such as:

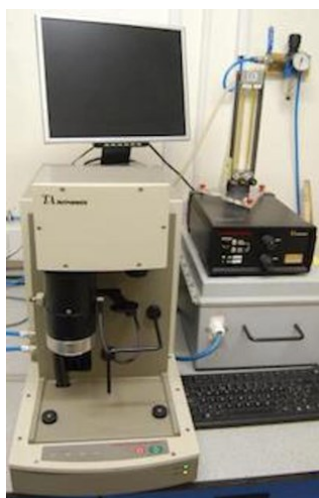
- Melting Point/Melting Range.
- Heat Capacity.
- Crystallisation.
- Glass Transition Temperature (T_g).
- Thermal Stability.
- Decomposition Temperature.
- Standard Oxidation Induction Time (OTT).
- Purity.

ThermoGravimetric Analysis (TGA) is a method of thermal analysis in which changes in physical and chemical properties of materials are measured as a function of increasing temperature (with constant heating rate), or as a function of time (with constant temperature and / or constant mass loss).

TGA measures the change in mass of a material as it is heated. Interpretation can provide evidence of vaporising, sublimation, absorption, adsorption, and desorption from the sample. This can be performed in inert or oxidising atmospheres to allow degradation temperatures to be explored in inert or oxidizing conditions.

Commonly the TGA thermogram can give information about the sample, for example:

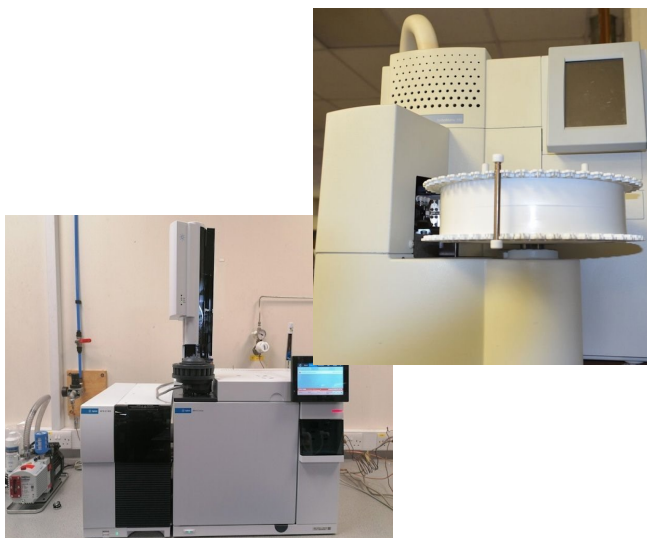
- Level of solvent.
- Degree of hydration.
- Temperature at which a sample thermally decomposes or oxidises.
- Inorganic Residue content.
- Organic Vs Carbon black compositions.
- Optimum Degradation Temperature (ODT) .



Thermal Desorption GC-MS Analysis

Thermal desorption (TD) is a sampling technique which is coupled with Gas Chromatography Mass spectrometry (GC-MS) to allow a high degree of sensitivity with the power to identify organic chemical components. Thermal desorption involves heating the sample in a flow of inert gas which extracts Volatile Organic Compounds (VOCs) and semi-volatiles substances from the heated product. Thermal desorption can be applied to polymer and rubber based products usually as headspace, solvent extractables or environmental organic gas samples using TENAX gas sampling tubes.

Extractables analysis or volatile contaminants by TD-GC-MS is a common technique for evaluating the extractable materials in pharmaceutical, medical devices and packaging. The volatile contaminants within a product may need to be analysed to understand failures (product or process) or to provide evidence to regulatory compliance.



Depending on the product and the study needed to understand the extractables content, the approach could use either Headspace-GC-MS, TD-GC-MS or Pyrolysis-GC-MS to both identify and quantify Volatile Organic Compounds (VOCs) plus semi-volatiles substances. LPD have Headspace-GC-MS, TD-GC-MS or Pyrolysis-GC-MS on-site and ready for use with extractables analysis.

Research and Development Analytical Labs

LPD Lab Services' business model allows clients to outsource some or all of their Development/R&D function or process. The range of analytical equipment allows LPD offer high quality and technical insight into developing both the chemical, physical and material aspects of the product.

The company's scientists immerse themselves in the technical needs of the project, communicate regularly and become an extension of the client scientific function in developing new IP and technical problem solving for the client's exclusive use.

To understand more about our outsourced function plus other expanding services and analytical testing capability, please visit our website or call us on 01254 676074. Alternatively, arrange to meet the team and see the laboratory located in Blackburn, Lancashire.

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