



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

Newsletter Autumn 2021

Welcome to the autumn 2021 edition of LPD Lab Services newsletter.

LPD Lab Services are the experts in materials, chemicals, process development and scientific problem solving for products and processes across all sectors within Manufacturing, Engineering, Development and Research.

The COVID-19 pandemic has been an interesting period for LPD Lab Services. The company has started working with increasing numbers of new clients solving analytical (material and chemical) problems, innovative product design, troubleshooting production processes, investigating forensics claims and have provided innovative research for complex new products. Our measurement and quality control testing has grown as clients look for reliability and quality of testing as well as typical technical expertise explaining and acting on the practicalities of the findings. Our scientific and engineering credibility and confidentiality is core to our business model.

This Edition at LPD Lab Services:

- **Degradation of Plastic, Rubbers and Coatings.**
- **Antimicrobial Coatings and Polymers.**
- **Matt Edwards, New Starter with Capacity and Capability Expansion.**
- **Degree Apprenticeship - Iola Main.**
- **Growing Additional GC-MS capacity.**
- **JOSCAR Certification.**
- **Out-sourced Lab Function and R&D Support**

Degradation of Plastics, Rubbers and Coatings

Polymers and rubbers are part of everyday life and are used in a wide variety of products. Understanding their **chemical compatibility** and/or **degradation** will affect their design, manufacturing processes and robustness over environmental service lifetimes.

Some polymers do degrade over time due to flaws within the manufacturing process, the choice of material or through environmental factors such as UV radiation or even chemicals and solvents or cleaning agents that may not be compatible during day-to-day use.

Polymer degradation symptoms can include **environmental stress cracking (ESC)**, solvent swelling, loss of elasticity and embrittlement, hydrolysis, oxidation, depolymerisation and discolouration dependent on the type of material and the environment the material is exposed to. An example is polybutylene pipe which can be degraded in hot water.

Chemical compatibility of polymer products has created new issues as a result of more rigorous cleaning regimes implemented to control the spread of COVID-19. For example, commonly used cationic antimicrobial products such as quaternary ammonium compounds can adsorb onto the surface of polymers which can interact with the surface and start to degrade and lead to a physical failure of the product.

LPD Lab Services uses its combination of consultancy experience and materials failure investigation techniques, such as optical microscopy, SEM/EDX, FTIR, NIR microscopy, DSC, TGA, pyrolysis GC-MS, XPS and cross-sectional investigations to look for and determine the signs of chemical incompatibility as well as evaluate the symptoms and mechanisms of observed degradation.



Antimicrobial Coatings and Polymers

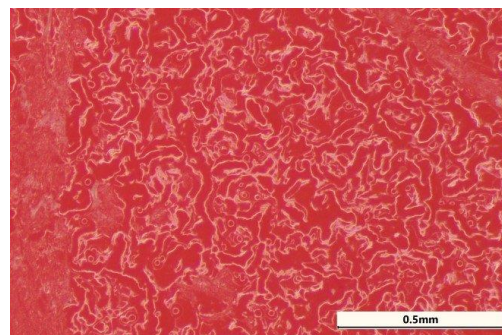
Antimicrobial coatings and antimicrobial polymers have become popular in recent years to help reduce the spread of microorganisms. This can have a lower financial and environmental cost compared to more traditional manual cleaning fluids and methods.

LPD can provide a variety of analytical techniques to determine the **surface chemistry** depending on a clients material or product.

Starting with **Scanning Electron Microscopy (SEM)** the topography of a surface can be analysed to assess the viability of microorganisms attaching to the surface and also of bacteria forming biofilms.

Using **OCA (Optical Contact Angle)** it is possible to determine **surface wettability**, which can link to bacterial attachment on a surface. **X-ray Photoelectron Spectroscopy (XPS)** can determine the chemistry of the outer atomic layers, critical in antimicrobial action and **surface wetting**. Some polymers will be formulated with active surface species, including into a masterbatch, with antimicrobial elements like silver.

If silver is being used as the antimicrobial agent, the silver ion concentration can be determined by **Atomic Absorption Spectrometry (AAS)** after extraction of the silver from the product matrix or the additive can be elementally mapped using **SEM/EDX** to look at uniformity of dispersion which will affect product performance.



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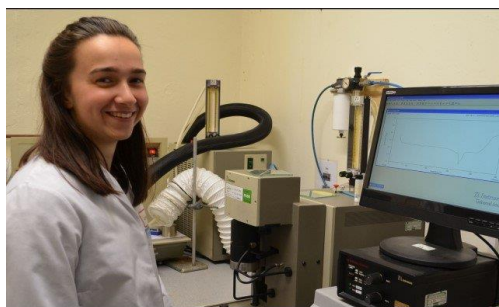
New Starter – Matt Edwards – Analytical Chemist

Key to the company's business is the experience of its staff. LPD Lab Services would like to introduce **Matt Edwards** who joined LPD in the summer of 2021. The continued growth especially in organic analysis and analytical chemistry has allowed the company's headcount to increase. Matt graduated with a MSc in Chemistry from York University in 2006 and focused his work around R&D and development of analytical techniques such as HPLC, LCMS and GC. Matt spent nearly 10 years focused on development of extractables and leachables, testing filtration products used in the Pharmaceutical, Aerospace and Food and Beverage sectors. Matt continued to grow his experience and spent 2 years teaching Secondary Science and A-level Chemistry before moving back into lab-based role in QC within the pharmaceutical sector testing a wide variety of products both in bulk API and finished products.

Matt's role at LPD covers a variety of chemical analytical techniques including HPLC, GC, GC-MS, FTIR and UV-Vis.



Investing in the future – A Very modern Apprenticeship



It is a great pleasure to introduce and welcome **Iola Main** to LPD Lab Services. Iola originally joined LPD in 2020 for an industrial year, before starting university. She has successfully applied and has just started a Laboratory Scientist (Chemistry) Level 6 Degree Apprenticeship delivered by Nottingham University supported by the company.

Iola has shown her enthusiasm and aptitude for chemistry and soon became an integrated member of the team. This is the first apprenticeship that LPD have embarked on, and the company is immensely proud to support Iola on her journey and build her industrial experience while working at LPD

Growing Additional GC-MS Capacity

In October 2021, LPD Lab Services took delivery of a brand-new Agilent GC-MS (8890GC/5977B MSD) with an auto-sampler for direct injection of organics or solvent digested polymers and organic compounds.

This extends the lab's existing GC-MS capability. LPD currently have various GC-MS sampling techniques available depending on the technical requirements of the project and material. These include headspace, pyrolysis injector and thermal desorption sampler. This second GC-MS allows a more efficient flow of analytical projects as the organic and polymer analysis continues to grow in volume and complexity. It allows the handling of more aggressive unknown chemical species, particularly within polymer systems using pyrolysis GC-MS as this instrument has a more robust design than the labs older system. This compliments our current organic analytical techniques of GC-FID, HPLC- DAD, FTIR/NIR and FTIR microscope.

JOSCAR Certification

LPD Lab Services limited has continued its registration with the JOSCAR certification process which was originally achieved in March 2020. The JOSCAR (the Joint Supply Chain Accreditation Register) is a collaborative tool used by the aerospace, defence and security industries to act as pre-qualification and compliance information suppliers.



Outsourced Product Development / R&D /Analytical Labs

LPD Lab Services business model allows clients to outsource some or all of their Development / R&D function. Our service covers independent testing, routine analysis and technical consultancy. In-house, the laboratory has practical experience in supporting routine analysis and New Product Development using analytical evidence, developing new IP and technical problem solving for the client's exclusive use.

To understand more about our outsourced function, expanding technical services and analytical testing capability please visit our website <https://www.lpdlabservices.co.uk>, or call us on 01254 676074 and discuss the problem/technique. Alternatively, you could arrange to meet the team and see the laboratory located in Blackburn, Lancashire.

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