May 2024
LPD Lab Services
TEL: +44 (0)1254 676 074

Newsletter

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

Welcome to the May 2024 edition of LPD Lab Services newsletter.

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

LPD Lab Services develop innovative and practical analytical solutions, as well as bespoke testing methods for in-process manufacturing, finished products and field failure plus development of new products and materials. Staff pride themselves resolving some fascinating and complex technical problems from across diverse product ranges and sectors of industry. The laboratory offers scientific and engineering solutions, with timely response times and clear communications, which are all core to the company's business model.

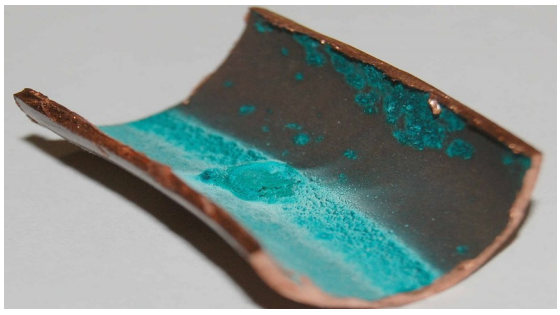
This Edition at LPD Lab Services:

- **Corrosion and Failure Investigations.**
- **Particles, Contaminants and Debris in Foods, Beverages, Medical Devices and Pharmaceutical Products.**
- **Problem-Solvers and Technical Thinkers - Our Team behind The Lab: Meet our MD.**

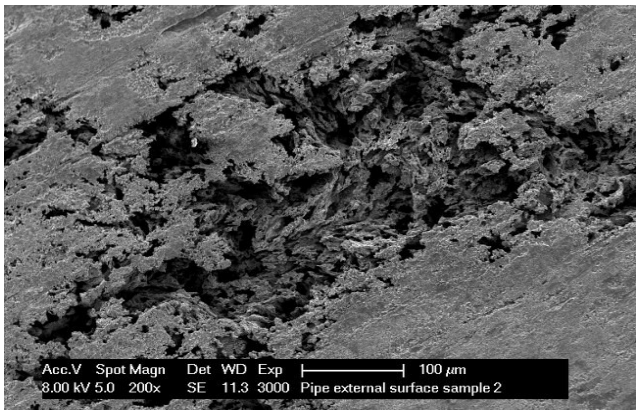
Corrosion and Failure Investigations

Corrosion can be a pervasive problem. It is a gradual deterioration of metals and alloys due to moisture, air, chemicals, microbial induced corrosion reactions (MIC), incompatibilities of dissimilar metals or metallurgical phases locally. If left unaddressed it can lead to consequences. Aside from ruining the aesthetic, it can cause significant damage, component weakening, and failures which result in costly repairs or replacement, and indeed product reputational damage in the market place.

Corrosion can manifest itself in many different forms, including galvanic, corrosion cracking, pitting or under film corrosion which can appear in unexpected places, although is more likely to be catastrophic when the attack is localised.



Most general metal corrosion, apart from pitting is usually a slow process. There is a particularly aggressive and often catastrophic form known as Stress Corrosion Cracking (SCC). Pinhole or pitting corrosion is common with metal piping when insulated with phenolic foam, which whilst offering excellent thermal insulation, can create an acidic environment that can attack the steel or copper pipework causing infrastructure failures. One method LPD Lab Services can use to determine susceptibility to aggressive corrosion



pitting, or galvanic attack behaviour, is to use Potentiostat Electrochemical Testing, which is an excellent way to assess susceptibility to corrosion mechanisms on manufactured parts in an accelerated way.

At LPD Lab Services experienced analysts and consultants can offer corrosion and oxidation investigations, to identify the problem plus offer solutions for preventative measures and suggest ways to reduce or eliminate the impact. Alternatively, the lab can also offer other tailored consultancy, and technical services.

Laboratory Hotline: +44 (0) 1254 676074 **e**: enquiries@lpdlabservices.co.uk **w**: www.lpdlabservices.co.uk

LPD Lab Services Limited, Suite 1, D Building, Glenfield Business, Philips Road, Blackburn, Lancashire, BB1 5RZ

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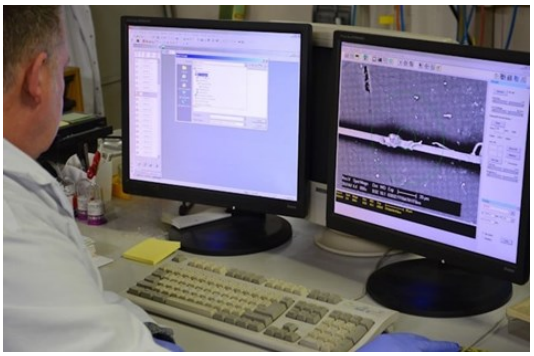
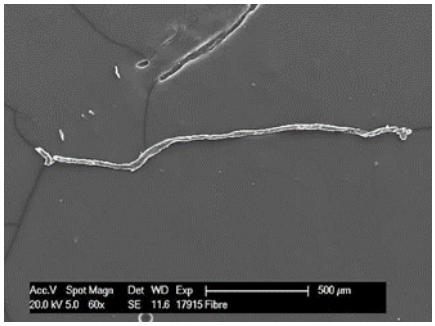
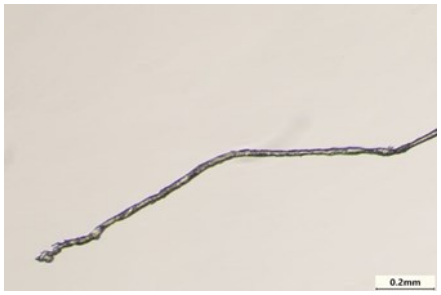
Particles, Contaminants and Debris in Foods, Beverages, Medical Devices and Pharmaceutical Products

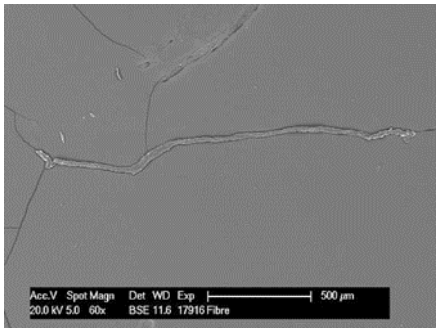
LPD Lab Services have two decades of experience in isolating foreign particles from foods, beverages, and pharmaceutical products as well as in clinical products, medical devices and formulations. Often visible particles or fibres in solution are identified by the customer: Lab staff then isolate particles from liquids using delicate sampling methods like micro-pipetting for further in-depth analysis using techniques such as optical light microscopy (OLM), scanning electron microscopy (SEM/EDX), and either macroscopic Fourier transform infra-red (FTIR) spectroscopy, or using a state-of-the-art FTIR microscope. Analysis conducted by SEM can use both secondary electron (SE), and backscattered electron (BSE), imaging, as illustrated. The SE images show the sample topography which is used to look at the size and morphology of the particles and fibres found. The BSE greyscale image provides information about the chemical uniformity of the sample surface with a uniform grey shade, indicating a uniform elemental composition.

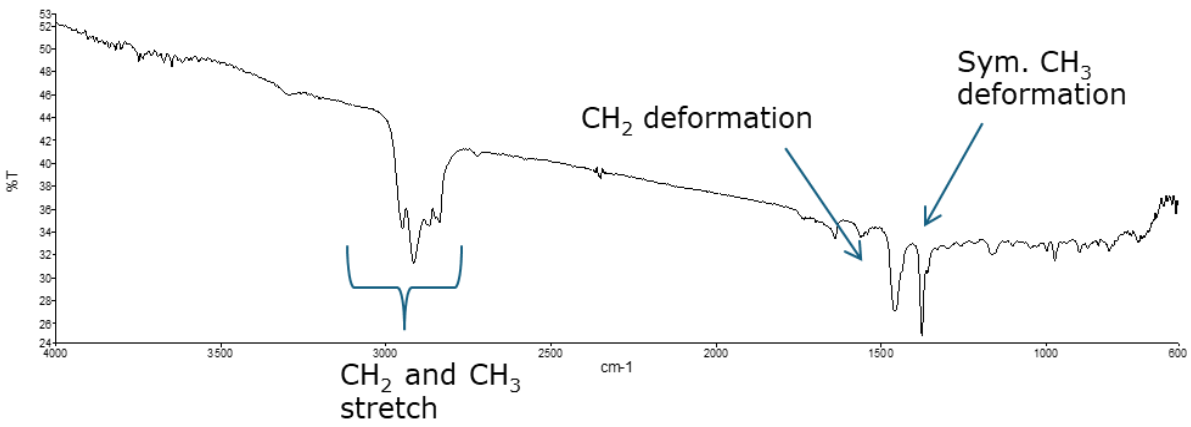
Brighter contrasting areas in a BSE image indicate the presence of higher atomic number elements, such as sub-micron metallic particles. Darker contrasting areas may be indicative of lower atomic number elements typical of organic materials. Samples may then be analyzed for their elemental signature by energy dispersive X-ray (EDX) analysis which is particularly informative for inorganic or metallic contaminants. Areas high in carbon, oxygen, and perhaps nitrogen, are indicative of organic materials, which may be further explored using either macroscopic Fourier transform infra-red (FTIR) spectroscopy, or using FTIR microscopy. Larger organic particles (>1mm across) may be analyzed using macroscopic FTIR spectroscopy using either a diamond or germanium ATR prism, while smaller organic particles and fibres (<1mm across), like the one in the images above which can be explored using FTIR microscopy fitted with a germanium micro-ATR prism.











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Problem-Solvers and Technical Thinkers - Our Team behind The Lab

Interview with our MD - Dr Stephen Jenkins

Q: Why did you start the company?

I have an enthusiasm for the industry and in product and process development. My colleagues and I spent many years in manufacturing and in product research and development. There is a clear need by companies for targeted analytical and consultancy services that speaks the language customers understand, all of which LPD Lab Services proudly provide. Small and large lab test houses often fail to do this, and cannot serve bespoke needs of clients, where analytical recipes are not defined for them to follow. The varieties of problems LPD Lab Services staff have encountered have been huge over the years; spanning chemistry, material science and engineering.

Q: What do we do as a business?

We provide a bespoke, technical, problem-solving, and consultancy services using a huge range of analytical techniques which are combined in one place and normally only available in universities or multi-national companies. Our staff have a wealth of knowledge and experience, offering timely and pragmatic solutions to real world problems. We cover a huge variety of industries - including construction, medical devices, manufacturing / engineering, corrosion and failure investigation, electronics, aerospace, pharmaceutical contamination, metallurgy, chemical industries - involving current field and manufacturing problems - to research and development issues, including product volume scale up. What we are not: is a routine test-house by default, but we do get asked to do this sort of work by customers as they trust we will do a good job. For example: In these environments we investigate the unusual, and keep a client manufacturing rather than provide odd results that are not explained, and lead to unnecessary quality rejects, or line stops

Q: What motivates the team?

What motivates us is that we all find the variety and technical challenges interesting. The scope of the work is diverse, and can be small or large projects with specific or more open-ended goals driven by the requirements of the client. No two days are the ever the same, and, quite simply, we are passionate about what we do, enjoying helping customers drive their products and processes forward, or recover them from difficult circumstances to save their companies money.

Q: How has work evolved over the years?

We have had work from over 2700 companies over the last 20 years, from multi-nationals through to SMEs down to one-man-bands. Every month we get new clients who find us, often by word-of-mouth or finding us from our extensive website; but we also have regular customers who return to us because they know we will provide them with a solution. They know that it is a struggle to find good technical people, and sometimes they will purchase equipment and supply instruments for us to be able to help them. Giving an expert the right tools for the job will get an even faster solution in bigger projects, but of course we have an impressive range of analytical techniques already. Often a customer will come back to us to ask us to help avoid a problem, rather than having to solve a failure; this is product and process development.

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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