NEWSLETTER

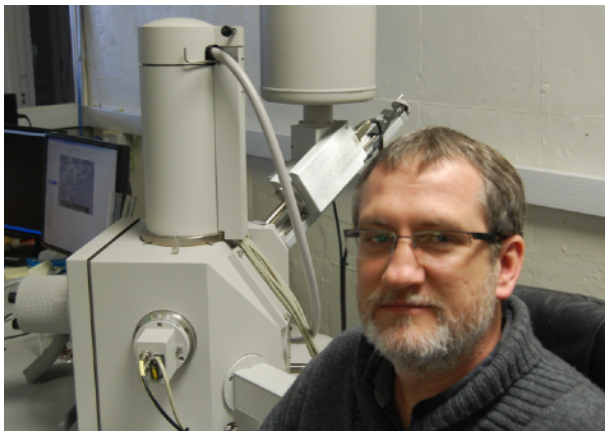
LPD Lab Services
TEL: +44 (0)1254 676 074

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

Welcome to the spring edition of LPD Lab Services newsletter. LPD have continued with their successful year in 2016 and the company continues to grow allowing further investment in technical expertise, equipment capability and service delivery. This has involved recruiting Danie Els, an experienced Senior Metallurgist.

In February, Danie Els joined the company as a senior metallurgist and corrosion scientist. His main responsibilities are metallurgical assessments, failure analyses and consultancy spreading into wider materials and product failure investigations involving Optical Microscopy, SEM/EDX and TGA.

Danie studied Physical Metallurgy (BTech) at the Vaal University of Technology and Corrosion Control Engineering (MSc) at the University of Manchester and has spent 24 years in industry with experience in steel rolling, heat treatment and forging. Most of his career has involved quality control, process control, material testing, and failure examination. He has experience of many types of routine metallographic examination, standard corrosion testing, failure examination, reverse engineering, remnant creep life assessment and metallurgical consultation.



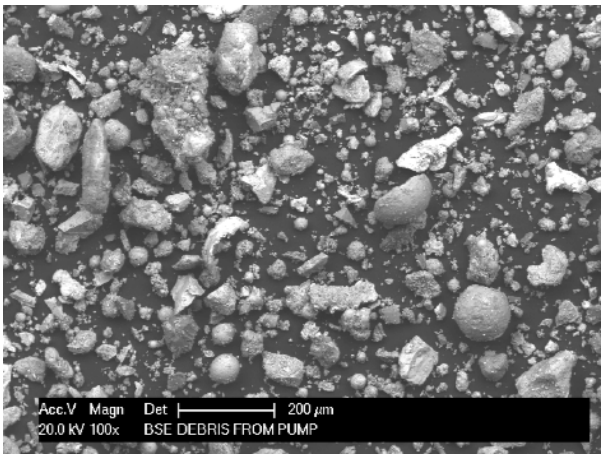
Application of SEM/EDX - Scanning Electron Microscopy

LPD has 2 SEM/EDX instruments reflecting the demand for the company's technical experience. Whilst SEM instruments are fairly commonplace across the UK, the knowledge and expertise in using the instruments in an insightful fashion to provide practical advice is rare. LPD staff are able to use their extensive experience to provide added value and ultimately save client money. Applications include product and process development, production and field failure investigations to determine practical containment actions and solutions to customer's problems.

The combined power of optical and scanning electron microscopy techniques (OM & SEM), along with elemental composition analysis afforded by X-ray analysis, has continued to find wide application across industries and materials types: Many cases of root-cause failure analysis have been completed. Examples include, large numbers of corrosion failure activities involving standard pipework and failed component manufacture through to assessing the causes for electrical failure on a number of printed circuit board investigations. Similarly, regular analysis has been carried out on dust materials found in components held before market, or accumulated through a wide variety of manufacturing environments and requiring identification for potential hazard assessment for human exposure. The use of OM and SEM techniques has remained central in failure analysis of glass components, as well as providing validation work across materials disciplines – from antique glass classification, through to ever-increasing application in general metallurgical investigations. These have been expanding, from assisting other techniques in defining root cause of engine component failures (such as μCT-X-ray imaging) through to validation of materials used in critical mechanical applications.

Within Metallurgy

- Particle contamination isolation, characterisation, identification and elimination in processes and complex products.
- Identifications of the reasons for poor cosmetic appearance of heat exchanger and boiler blockages and degradation.
- Corrosion Investigations.
- Poor metallic plating or paint coating appearance, thickness or blistering.



Within Electronics

- Defects within solder balls, solder splashes, swarf from cutting, flux residues.
- Detection of chlorine (corrosion accelerant) indicates perhaps a chlorinated flux which can corrode components.
- Confirmation of the materials used in the circuit board - plating layers, solder types.
- Cross-section of circuit boards to look for cracks in solder areas.
- Potential sources of failure (fire) and analysis of nearby circuitry areas and / or good and bad boards to indicate reasons for fire.
- Checking solder for banned / illegal chemicals like Lead in solder for personal use products like e-cigarettes.
- Investigation of electrical cable construction.

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Within Products

- Physical failure analysis of domestic water heaters and boilers.
- Investigation of blistered coating on a yacht caused by sodium chloride crystals.
- Investigation of cracked plastic component.
- Stains on car roof liner fabric - find spherical mild steel particles from metal working.
- Root cause of wear debris in train and ship water pump systems to determine wearing parts.

Within Chemicals and Materials

- Analysis of chipboard cores for evidence of paint residues as a source of lead. chromium and arsenic.
- Detection of zinc whiskers in data centres.
- Investigation of nitride hard coatings on steel.
- Analysis of debris in recycled solvents.
- Assessments of surface texture and cleanliness for coating and adhesive bonding for metals, ceramics, composite materials and polymers.
- SEM / EDX chemical mapping of the different phases within metals and weld areas.

Within Legal / Insurance Claims, Construction and Infrastructure

- Investigation of residues from container fire - calcium carbonate deposit.
- Corrosion and physical failure analysis of chilled and heated water systems and piping.