



DRIVING INNOVATION

Automotive Materials Analysis

Automotive Analysis for Every Car Part

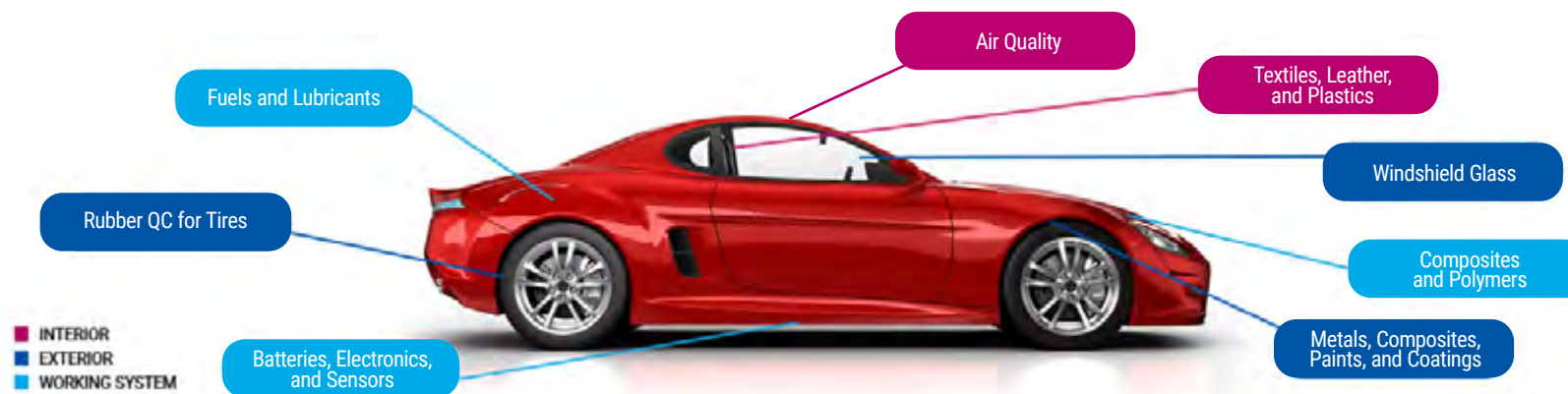
For many car buyers, automobiles are simply tools, a way to go from point A to point B. For others, it's a symbol of who they are – “you are what you drive.” But neither group thinks too much about the myriad decisions that define automakers’ end products. In this highly regulated industry, companies must consider international regulations for safety as well as aesthetics, comfort, operations, and efficiency. Every component of the heavy vehicles, passenger cars, sports vehicles, and motorcycles they produce undergoes quality checks – and these automakers know that product failures and recalls are costly, not only financially, but also to their reputation and brand.

Improve Quality, Efficiency, and Safety – While Reducing Environmental Impact

Meeting international regulations and consumer expectations for vehicles and parts requires a rigorous regime of quality testing to ensure product safety and efficacy – one that takes stringent government regulations and environmental concerns into account. So we deliver a diverse portfolio of analytical solutions and lab services for the automotive industry globally.

Putting Automotive to the Test

From back bumper to front grill, from impurities testing to manufacturing QA/QC, our solutions analyze everything in the automotive workflow.



Keep Pace with the Leader

Given our expertise in some of the most demanding automotive arenas – including construction and professional racing – you can rely on us to deliver cutting-edge, reliable analytical solutions and support for material and chemical testing of automotive parts such as tires, glass, polymers, and other materials.

As a car manufacturer or supplier, you can count on us for a broad range of proven testing technologies, services, and consumables. These solutions enable you to meet regulatory requirements and provide safe, ecofriendly automobiles that deliver the highest levels of performance.

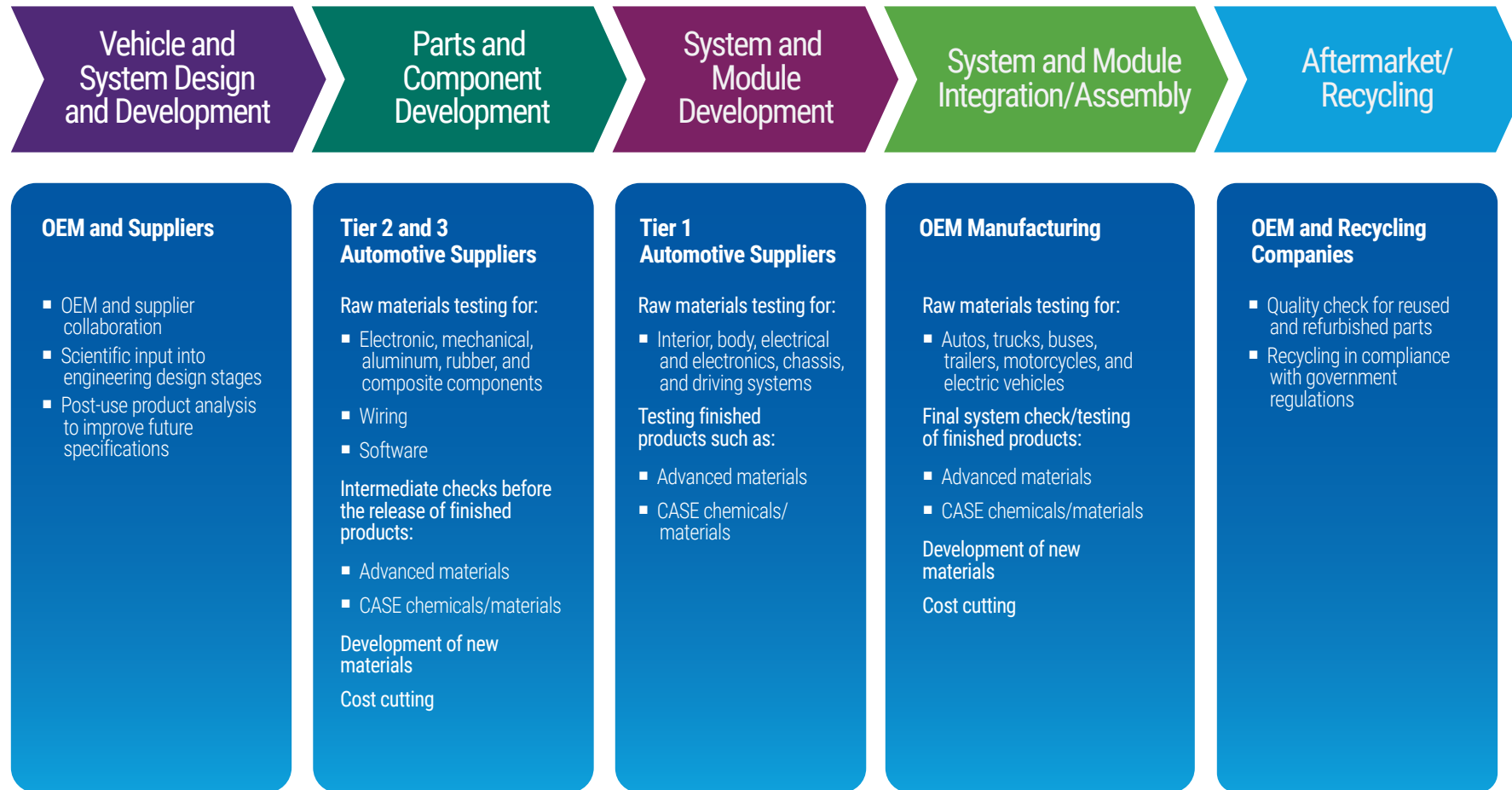


This case study shows you how we offer analytical expertise in helping the **Alpine F1® team** master the thermal stability challenge.

Read about on-the-spot lubricant and fuel testing at the **International North West 200 motorcycle race** and the Italian Superbike Championship.

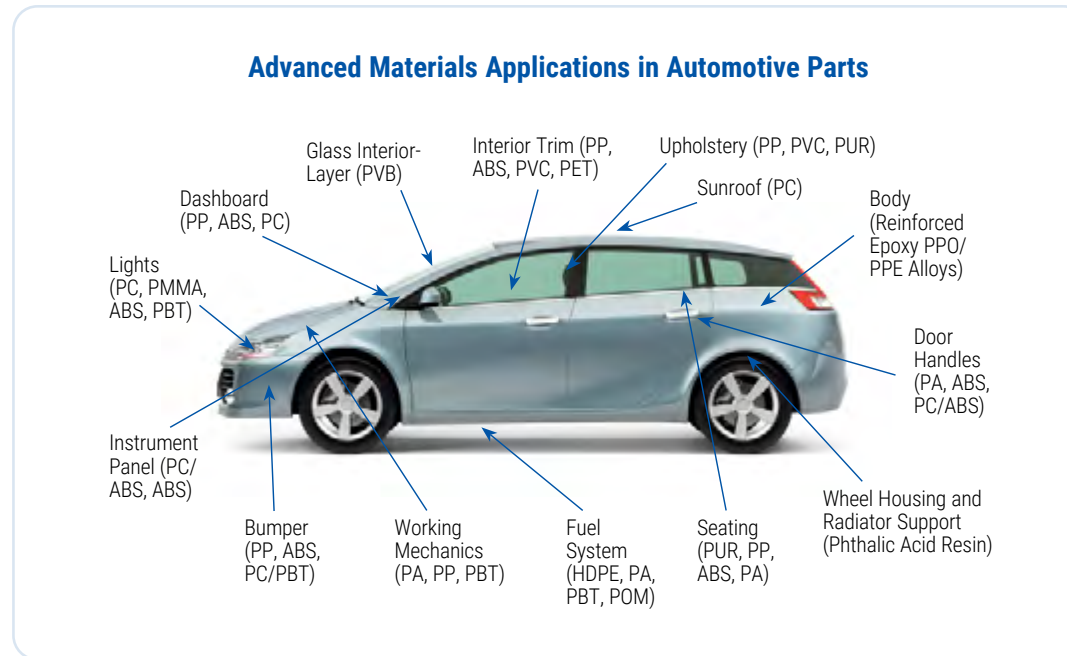
This case study discusses how a **Caterpillar** dealer improved accuracy and decreased turnaround time with a high-performance liquid particle counter.

Solutions for the Entire Auto Value Chain



Advanced Materials, Advanced Solutions

Advanced materials are created through specialized processing and synthesis technology and encompass a wide array of materials, including polymers, rubbers, composites, coatings, adhesives, sealants, and elastomers. When investigating advanced materials, you need reliable laboratory solutions that enable you to identify and characterize the engineered properties you're trying to achieve while meeting industrial and customer specifications. Our solutions help you meet the analytical challenges presented by the characterization of these advanced materials and complex formulations – and meet stringent regulatory guidelines.



Polymeric Materials

With today's emphasis on the environment and recycling, the automotive industry is becoming more intelligent in its use of polymers.

CASE Materials

Coatings, adhesives, sealants, and elastomers (CASE) are important to automobiles' performance, safety, and durability.

Rubber and Composite Materials

Tires and other auto components contain rubber compounds that enable them to safely perform under a wide range of demanding conditions.

Polymers Get Road Tested

With today's emphasis on the environment and recycling, the automotive industry is becoming more cautious in its use of plastics. Polypropylene, polyvinyl chloride (PVC), acrylonitrile butadiene styrene (ABS), and polyurethane make up more than 80% of plastics used by the auto industry, raising some safety and sustainability concerns.

One of the biggest challenges for carmakers is to reduce the weight of automobiles to reduce fuel consumption. OEMs and suppliers are scrambling to develop multimaterial vehicles that incorporate aluminum, high-strength steel, magnesium, titanium, and various types of foam and rubber.

Composites are also being used to make lighter, safer, and more fuel-efficient vehicles. These high-performance fibers, such as carbon or glass, in a matrix material such as epoxy polymer combine to provide enhanced properties compared with those materials alone. Carbon-fiber composites weigh about one-fifth as much as steel but can offer better stiffness and strength – plus, they don't rust or corrode. In fact, composites could significantly increase vehicle fuel economy by reducing vehicle weight by as much as 60%.



Read how our high-performance **Power Compensation DSC** technique yields enhanced characterization of polymer blends.

Learn about how our **Polymer ID Analyzer** can help with your for qualitative analysis of polymers, quantification of components in complex polymer mixtures, and analysis of in-process samples.

FT-IR can also be used to analyze recycled polyethylene resin for polypropylene contamination.

Making the CASE for Advanced Materials

Coatings, adhesives, sealants, and elastomers (CASE) are important to all facets of global industrial and consumer product manufacturing, enhancing performance, protection, smooth operation, strength, and durability.

CASE manufacturers are constantly evolving formulations to innovate new products, so they need solutions that enable accurate identification and qualification of raw materials and development of robust, reliable QA/QC methods that comply with industry regulations. To maintain the highest levels of quality means monitoring and analyses throughout the chemical production cycle:

- Testing raw materials
- Evaluating samples for formulation, weathering, and corrosion resistance
- Testing for dry time, film thickness, and flexural strength
- Detection of VOC



In this white paper, read more about the analysis of CASE materials, especially paints and coatings.

This application note explores DSC for analyzing cure and crosslinking reactions associated with thermosetting materials.

Explore the range of applications on our CASE chemicals HUB page.

Learn more about how GC/MS systems can effectively analyze common epoxies, as well as identify and quantify off-gassing during analysis.

Where the Rubber (and Composites) Meet the Road

Tires contain many rubber compounds and other materials that enable them to safely perform under a wide range of demanding conditions. Because of its high resistance to wear, polybutadiene (PBD) is used in the manufacture of tire treads and sidewalls, and it acts as a modifier in other plastics, particularly in high-impact polystyrene (HIPS) and acrylonitrile butadiene styrene (ABS), which is used to make interior components such as dashboards and steering wheel covers.

PBD has excellent abrasion resistance, low hysteresis loss and rolling resistance, and high elasticity due to its low glass-transition temperature, which can be measured using our DSC and other thermal analysis solutions. To optimize performance, it's often compounded with elastomers such as natural rubber and styrene butadiene rubber (SBR).



Read how our **TGA solutions** achieve reliable accuracy in quantifying the components of automotive rubber products, while reducing test times significantly.

See how our **Dynamic Mechanical Analyzer DMA 8000** helps researchers overcome the challenges of investigating relaxation events in rubbery samples.

Learn about pyrolysis behavior of rubber at high temperature – key to the recovery and use of rubber – using pyrolysis **GC/MS**.

It's What's Inside That Counts

Most in-vehicle interior components are made of plastics, rubber, leather, textiles, glues, sealants, and other materials that contain various amounts of volatile organic compounds (VOCs) and other chemicals. It's now well-known that the "new car smell" buyers love is the result of chemicals emitted from interior components such as the dashboard, interior panels, seat coverings, and so on. Exposure to these chemicals can have a significant impact on human health. Carmakers must comply with VDA 278 regulation to avoid negative health and environmental effects.

Airbags are one of the most important safety innovations of recent decades. Usually, airbag fabrics are flexible enough to be tightly folded, yet sufficiently strong to withstand deployment. Airbag developers are hard at work reducing their weight to minimize injuries at deployment and to make them more compact for space savings.



This application note describes a method for qualitative analysis of the olfactory character of each component using the **TD-GC/MS** olfactory port.

Read our eBook about compliance with VDA 278 regulations which outlines testing using our **Clarus® SQ8 GC/MS** and **TurboMatrix™ ATD** to ensure VOCs in ehicles don't impact human health.

Watch as Dr. Roland Freudenmann, global laboratories director at Continental in Hanover, shares his experience developing vehicle interior surface materials.

Autos Go Electric and Online

With the increasing importance of electrification and electronics in the automotive value chain, several electronics and semiconductor companies have entered or expanded their presence in the automotive industry. An electric car can easily have more than 3,000 chips, and electronics account for 40% or more of the total cost of a vehicle.

Semiconductors play a major role in automobiles' engine, power train, chassis, the electronics system, safety, control, and more. In the automotive electronics segments, light detection and ranging (LIDAR), advanced driver assistance systems (ADAS), connected vehicles, and electronic energy are groundbreaking technologies, promising significant growth potentials and already having a real impact on the automotive industry chain.

As a major player for analytical solutions in the semiconductor industry, we deliver solutions for testing and preventing impurities and contaminants in electrical components.



Learn about the solutions that semiconductor and electronics manufacturers use to enable smaller, faster components – and higher quality products.

Read about our thermal analysis instruments for the analysis and characterization of the critical physical, degradation, and mechanical properties of electronic materials.

Read more about testing for impurities in raw materials, R&D, and wafer production and the challenges the semiconductor industry faces, including employee safety and waste management.

Auto Glass from a Whole New Perspective

From windshields to mirrors to electronic screens, glass analysis in the automotive and transportation industry is crucial to ensuring safety and security. Deicing and demisting capabilities, integrated rain sensors for wiper activation, built-in antennas, reducing solar heat gain, plus growing demands for contemporary shaping and styling – these applications and more drive the auto-glass manufacturing industry. Our systems enable automakers to easily measure minimum and maximum transmission of a sample of automobile glass and comply with specified benchmarks of most international regulatory organizations.

And when determining properties such as color, light transmission and absorbance, and thermal and solar properties, our glass analysis solutions keep you in compliance with ISO13837, CIE, EN410, EN673, and other rigorous standards.



This white paper presents options for choosing the most appropriate **UV/Vis** or **UV/Vis/NIR system** for your glass analysis application.

Our interactive brochure shows how glass manufacturers can determine efficient energy storage and test raw materials for the required properties -- all while aligning with regulations.

Power Up Your Analysis

Many car manufacturers have announced their aim to stop selling petrol-powered and diesel models within the next decade. Governments at all levels have introduced regulations and incentives to accelerate the shift to sustainable mobility. And industry players are accelerating the speed of automotive technology innovation as they develop new concepts of electric, connected, autonomous, and shared mobility.

The role of batteries – and of battery component research and analysis – is pivotal in the e-mobility future. And as the world moves to embrace renewable energy sources and reduce our global CO₂ emissions, it will also be more dependent on battery technology.

Battery analysis is complex, so the need for tested and trusted analytical solutions has never been greater. Whether you're doing battery engineering and R&D, researching existing battery materials, or are focused on recycling and reuse, you rely on high-quality data for in-depth understanding of battery performance – at every stage of battery life.



This guide describes our extensive portfolio of analytical solutions for battery analysis.

See how we're working with Karlsruhe Institute of Technology (KIT) to provide instrumentation, expertise, and support for their material science investigations.

This infographic poster depicts the battery lifecycle and the material analyses required during each step.

Fueling Automotive Change

The fuel industry is heading in exciting new directions – but with innovation comes an increased need for testing. Blending biofuels with fossil fuels for use in diesel engines is now commonplace, making more rigorous regulations necessary to assure biodiesel blend conformance. From evaluating raw materials to processing byproducts to compliance testing of finished fuels, our comprehensive, application-specific biofuels development and testing solutions give your scientists everything they need to work with fatty acid methyl esters (FAMES).

At the same time, you can maximize your laboratory's prospects in biofuels development and testing while meeting diverse global regulatory requirements and ASTM standards for renewable energy products.



Read about fast, simple analysis of fuels with the **Spectrum Two™ FTIR** system.

Learn more about analysis of vanadium, nickel, sodium, and iron in fuel oils using flame atomic absorption spectrophotometry with the **PinAAcle™ 500** system.

See how our **Arnel 4004 analyzer** utilizes the same column set and valving for ASTM D4815 and ASTM D5580 – enabling greater sample flexibility.

The Smooth Operation of An Efficient Lab

Analyzing lubricants and coolants is paramount when it comes to meeting safety and quality standards. Hydraulics, transmission fluid, and gear and engine oils are all key components for keeping heavy machinery up and running smoothly. Monitoring oil condition for contamination (soot, water, glycol, unburned fuel), chemical degradation (oxidation, nitration, sulphur compounds, ester breakdown), or additive depletion is crucial to preventing lubricant or coolant failure and costly equipment damage

By 2030, it's expected that half the cars sold globally will be electrified. So it's no surprise that the lubricants industry is moving into e-fluids. Today's engine fluids are exposed to more electrical current and operating conditions are continually changing. In EVs, coolants are used differently than in combustion engines -- so e-fluids are being developed specifically for the EVs and are promoted with the value proposition of enhancing EV performance, range, and durability.



Read how our **Avio® 550 Max** fully simultaneous ICP-OES measures in-service coolant samples, providing accurate multielement determination and stability per ASTM method D6130.

With our **LPC 500™ liquid particle counter** in-line with the Avio® 550 Max ICP-OES Oils system, lubricant samples can be analyzed for both wear metals and particles all in one run.

In this poster infographic, we examine four types of laboratory workflow for analyzing in-service coolants used in motor engines and electric vehicles.

Learn more about our portfolio of easy-to-use, proven lubricant testing solutions to help you achieve accurate results in record time.

Innovation That Pushes Your Science Forward

Whether you're designing and developing safer and higher quality automobiles, improving their performance and lifespan, or researching the car of the future, our trusted solutions help you achieve accurate results that much faster. Because when your lab runs smoothly, you have more time to concentrate on your science.



Get the Most Out of Your Instruments and Your Analysis

You invest great efforts into your research – and we do the same with our consumables and accessories, tested and validated to fit your lab's requirements. That's why we developed a full range of quality consumables and accessories suitable for a range of materials analytical applications. Below is a selection of the most commonly required parts.



Concentric Meinhard Nebulizer



Concentric Meinhard Nebu GC Column, SPE, Graphite Tubes, LC Columns, AA Lamp, Torch, Syringe lizer



GC Capillary Columns



Headspace Vials, Syringe, Liners, Septa, and GC Capillary Column



ICP Cones, Torch, Baffled Cyclonic Spray Chamber



ICP-ICPMS Torch



Thermal Analysis Sample Pans and Covers

These products offer reliable performance, help control operating costs, and maximize instrument uptime. Like our trusted instruments, our consumables and accessories offer the best performance, over and over. [Click here to browse and shop.](#)

Smarter Questions, Faster Analysis

Our enterprise software solutions empower you to meet stricter regulation and the needs of an ever-changing world with an integrated data platform that leads to breakthrough innovation, accelerated product development, and speed to market.



ChemDraw®

A powerful chemical drawing tool that accelerates chemistry communication and reporting

Signals™ Notebook

The future-proof electronic notebook solution that covers a comprehensive set of scientific use cases, spanning biology, chemistry, formulations, analysis, and more.

TIBCO Spotfire®

Quickly analyze disparate data from multiple sources and create a complete picture of what's happening in real time.

E-Notebook™

Document analyses and leverage the knowledge gained from previous experiments.

Lead Discovery Premium

Discover actionable insights by seamlessly integrating chemical and biological molecules with activity results.

Complete Services for Increased Productivity and Efficiency



Today's lab leaders are facing several challenges, from tighter deadlines to increased budget scrutiny to teams with various degrees of comfort with lab equipment. Time that could be spent getting ahead is utilized on noncore activities.

To help you overcome barriers to success, OneSource® Laboratory Services has built a team of trained scientists and engineers who bring their real-life knowledge to you, helping increase your productivity with recommendations on how to best utilize your assets. With this knowledge, you can get back to your core mission.

Labs of all sizes need to know their equipment will work as expected, every time they turn it on. From contracts and performance maintenance available for our instruments as well as other manufacturers' equipment to full lab asset management delivered globally, we can help you make the most of your important lab assets.

And for labs looking to introduce new equipment and techniques, we offer training at our facilities and at yours.

OneSource Services

- Asset optimization
- Lab environment and instrument monitoring
- Asset location
- Education and training
- Technology and descriptive analysis
- Internet of lab things/lab of the future
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- Instrument qualifications



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