Our Solutions for Automotive

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Solutions for Automotive

We support new material developments required for next-generation vehicles

In recent years, new battery materials and power device materials that are used in electric vehicles and fuel cell vehicles have been actively investigated. Moreover, in response to further fuel consumption improvements and exhaust emission regulations for existing internal combustion engine vehicles, weight reduction based on new material development and catalyst development for exhaust emission purification is being continued. HORIBA Scientific supports the research and development of next-generation vehicles with various analytical instruments, and offers technologies that can contribute to the success of these developments.

Analytical examples of all vehicle parts

**Engine**
- Heavy metals in the engine oil (ICP-OES, XRF)
- Carbon content in the casting (Carbon analyzer)
- Particle size of the raw materials such as crude steel (Particle size analyzer)
- Carbon and hydrogen in titanium (Carbon and hydrogen analyzer)
- Lubricant film analyzer (Ellipsometer)

**Battery and fuel cells**
- Positive and negative electrode evaluation (Raman microscope, SEM-EDX etc.)
- Composition profile of thin and thick multilayers (GDOES)
- Quality evaluation of separators (GDOES, XRF, etc.)
- Degradation analysis of electrolytes (ICP-OES)

**Body**
- Particle size of paint (Particle size analyzer)
- Carbon, nitrogen and hydrogen in iron and steel (Carbon, nitrogen and hydrogen analyzer)
- Elemental depth profile of paint film (GDOES)

**Tires**
- Particle size of the carbons in aluminum (Particle size analyzer, hydrogen analyzer)
- Carbon and sulfur in the rubber (Carbon and sulfur analyzer)
- Chemical analysis (Raman microscope)

**Wheel**
- Hydrogen in aluminum (hydrogen analyzer)
- Basic and NVH investigation
- Performance brake testing

**Glass**
- Composition and thickness of functional layers (Ellipsometer, GDOES)

**Catalyst**
- Simultaneous real-time measurement of four nitrogen compounds (NO, NO₂, N₂O and NH₃)
- Gaseous adsorption on catalyst (Raman microscope)
- Performance brake testing

**Material evaluation**

**Catalyst evaluation**

**ELV / RoHS**

**Test and measurement solutions for the automotive industry**

For over five decades, HORIBA ATS has been a leading provider of turnkey solutions in the fields of engine exhaust analysis and instrumentation, as well as a key player in powertrain research and development. HORIBA has teams of service specialists working in over 50 countries around the world to ensure the smooth and efficient operation of test equipment at customer sites. In addition, with its state-of-the-art Test Centers in Germany, China, Japan and the United States of America, HORIBA runs advanced testing facilities for contract testing and in-house development.

HORIBA ATS covers various products and solutions in the areas of Emission Measurement Systems (EMS), Mechatronics (MCT) and Test Automation Systems (TAS).
Applications: Evaluation of DLC coating film

Composition and crystallinity can be observed by Raman microscopy. Diamond Like Carbon (DLC) film, used as a protective coating for automotive frictional parts, was evaluated. It was determined from the analysis that the DLC hardened film is 6000 Å thick and the surface roughness is 60 Å. In addition, information on film hardness was retrieved from refractive index.

The ellipsometer determines the thickness and refractive index of simple and multilayer films. It gives very useful information on film interface quality, crystallinity, oxidation state, etc... of simple and multilayer films. It gives very useful information on film hardness was retrieved from refractive index.

Surface treatment of all parts, plating and materials evaluation. With the latest developments, it is now possible to easily measure non-planar shaped specimens. These can be utilized for all parts, such as the chassis, engine peripheral parts and undercarriages; it can also be utilized for plating and materials evaluation.

Within a few minutes, this spectrometer determines the elements profiles of coatings and multilayers in a thickness range from 1 nm up to 100 µm.

Applications: Evaluation of DLC coating film

The EMGA series is a simultaneous oxygen, nitrogen and hydrogen elemental analyzer with high accuracy and repeatability suited to cutting-edge technology’s R&D as well as quality control in the market of steel, new materials, catalysts, etc.

The EMIA series is a dedicated Carbon-Sulfur analyzer. It is important to grasp the accurate quantity of hydrogen within aluminum materials used in wheel and engine parts because of its influence on hydrogen brittleness. With this instrument, it is possible to measure the amount of hydrogen with high precision.

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Real-time measurement of nitrogen compounds using Quantum Cascade Laser technology

HORIBA provides a new exhaust gas analyzer, MEXA-ONE-QL-NX, specifically designed for R&D investigations in the field of NOx after-treatment systems, such as urea-SCR, CRT and LNT, as defined in the EPA and EURO regulations for light-and heavy-duty as well as non-road engines.

This innovative analyzer uses Quantum Cascade Laser Mid-IR spectroscopy for simultaneous real-time measurement of NO, NO2, N2O and NH3. The precisely adjusted long dual-path optical cell provides ultra-high sensitivity, wide dynamic range, and short response times, i.e. NH3 < 5 sec.

Simulating braking energy using an inertia brake dynamometer

According to international regulations, brakes must be tested for conditions including: stopping, dragging, and a variety of endurance events. Simulating the loads, velocities, and road operation conditions of a complete vehicle are critical to ensure accurate test results.

The brake squeal behaviour can be investigated running by procedures like for e.g. SAE J2521. A microphone detects the squeal amplitudes automatically.

Tight emissions regulations around the globe drive the need for more advanced and reliable measurement solutions. With considerable experience in this field, HORIBA ATS offers state-of-the-art products with a long-standing reputation. The product range includes various analytical, on-board, and dilution-sampling systems as well as portable emission analyzers.

Customers demand outstanding performance and durability from their engines and components, while also requiring emissions, noise levels, and vibration behavior to be extremely low. To meet this need, HORIBA ATS employs a combination of robust engineering and advanced simulation techniques to provide tailor-made solutions for brake, engine, vehicle and powertrain testing-event wind tunnel balances.

For reporting and analysis of test results in the context of R&D, calibration, emission certification and quality assurance, HORIBA ATS offers comprehensive software tools for test cell automation and database systems.

HORIBA ONE Platform interface – MEXA-ONE-QL-NX
For more information,

visit our web site [www.horiba.com/scientific](http://www.horiba.com/scientific) and read our application notes.

or [www.horiba.com/automotive-test-systems](http://www.horiba.com/automotive-test-systems).