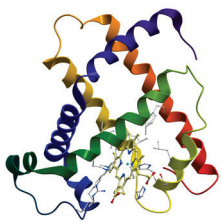
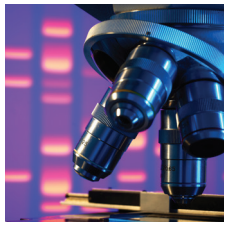
HORIBA Scientific

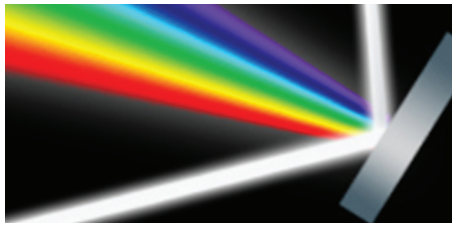
Science in Action Series

ELEMENTAL ANALYSIS
FLUORESCENCE
GRATINGS & OEM SPECTROMETERS
OPTICAL COMPONENTS
CUSTOM SOLUTIONS
PARTICLE CHARACTERIZATION
RAMAN / AFM-RAMAN / TERS
SPECTROSCOPIC ELLIPSOMETRY
SPR IMAGING

Elemental Analysis and a Cold Brew







Ahh, the ubiquitous car. How we take it for granted. We just slide in, tap into our favorite tunes and take to the road. But without the proper technology, the door would crack or the body would bend before we even got started.

That's where elemental analysis comes in. It's used in a number of industries, including metallurgy and power supplies for automobiles. It allows us to design vehicles that won't corrode, fade or fall apart.

GD Profiler 2

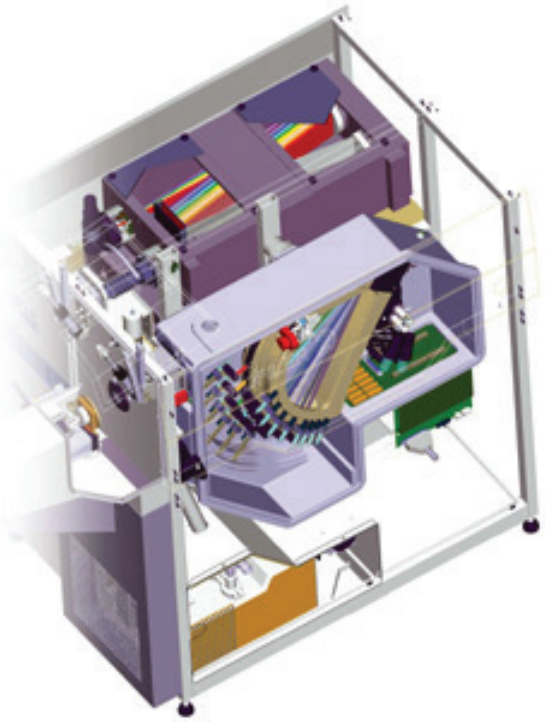
Elemental Analysis is a process where a sample of a material is analyzed for its elemental and sometimes isotopic composition. The process looks behind the molecules into the elements that compose the material, according to Matthieu Chausseau, Ph.D., Elemental Analysis & Thin Films Product Manager for HORIBA Scientific. The analysis can be qualitative or quantitative.

A sample can be analyzed in layers using a technique called depth profiling.

"When you have a sample, it's not just steel," he said. "There are a lot of layers and coatings with a car. You have a layer of steel and then you have a layer to prevent for corrosion, then you have a layer of to make the paints adhere to the steel then you have a layer of paint."

The contents of the metal, the elements, will affect the strength and hardness of the metal. For example, if it contains too much hydrogen it may crack. Or if it contains too much of something else it may be too soft. The elemental composition changes everything about the metal's characteristics.

Another example is a can of soda. It's made of aluminum, but without a protective layer it would taste like – aluminum. Each of those layers must have the proper elemental composition to perform according to the standards we expect.



HORIBA Scientific makes the GD Profiler 2, a Depth Profiling system that measures the composition of layers of a sample. It provides the elemental analysis crucial to fabricating materials that perform up to spec.

It's used by metallurgical companies producing steel because the composition of the steel defines its characteristics. There are also companies that are working on materials and the layers of bare steel or metal to improve its characteristics. "Something can go wrong in the manufacturing process," Chausseau said. "For example, with titanium, if there is too much hydrogen the plane will just break."

The GD Profiler 2 employs the technique of sputtering by plasma and spectrometric measurement, which yields elemental depth profiles. Conductive and non-conductive layers and materials can be measured, along with all elements, including H, O, Li, and N. The depth profile range is between 1nm-150 microns. Layers composition and thickness are readily available.

The information comes from pulsed RF GD-OES and DiP. It's fast and easy to use.

The GD Profiler 2 yields a sample's thickness & composition of the layers, gradients of concentration, presence of contaminants at interfaces, bulk composition and uniformity of the coatings.

It provides control of the fabrication process. Variations are rapidly detected, allowing quick corrective action.

The GD Profiler 2 is used extensively by major research institutions and companies in thin films PV and for metallurgy and lithium batteries to maintain a constant supply of materials with adequate performances.

There are many examples of automotive uses, including Renault in France where the first GD source was developed. In fact, all parts in an automobile can be checked with the GD Profiler 2 within the automotive market.

The GD Profiler 2 can also be used with lithium batteries for portable electronics and electrical vehicles, where we can study the different materials to better understand how they behave during the charge/discharge cycles.

Other markets for the product include coatings and treatments, metallurgy, LED,corrosion and material research.

For more information about the HORIBA GD Profiler 2, go to *http://www.HORIBA.com/us/en/scientific/products/atomic-emission-spectroscopy/glow-discharge/details/gd-profiler-hr-tm-564/* or contact Matthieu Chausseau at matthieu.chausseau@HORIBA.com.

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