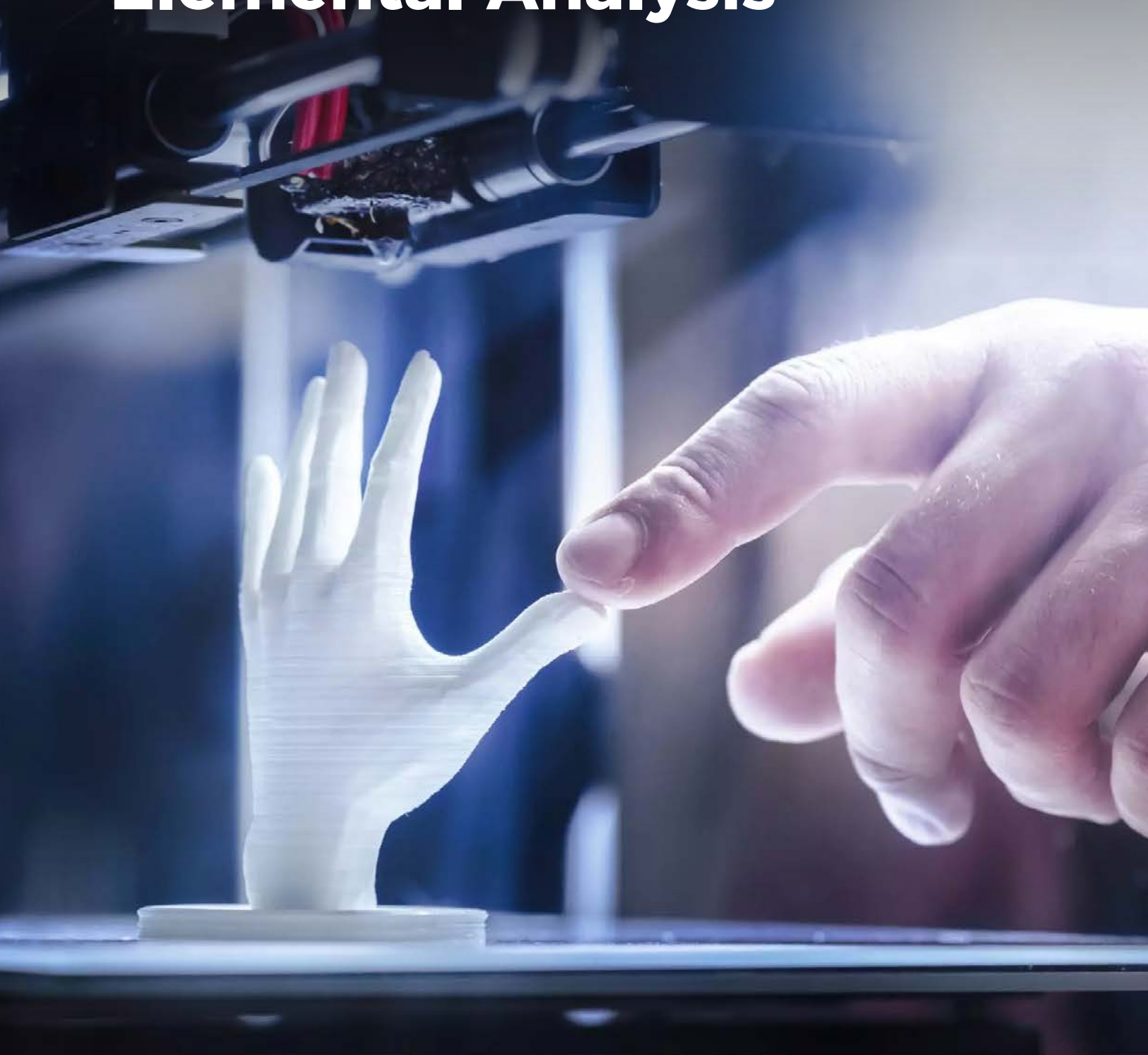




ADDITIVE MANUFACTURING

# Quality Control with Elemental Analysis





## More Visibility. Better Control.

Additive manufacturing has completely changed how manufacturers approach everything from product design to commercialization. The ability for a company to make intricate parts without the need for complicated re-tooling has revolutionized many industries, including automotive, aerospace, consumer goods, and more. But this new capability brought with it, its own set of challenges. And these challenges specifically relate to quality and reliability.

Quantum Analytics has a unique portfolio of sophisticated analytical instrumentation designed to tackle quality control issues head on. We offer everything from high-speed X-ray Microscopy (XRM) solutions for morphometry, CAD comparison, and parts inspection to combustion analysis for light element analysis on metal powders and post-printed parts.

These instruments are designed to deliver results that give you better control over your processes and ensure finished parts quality.

## Elemental Composition

The **Bruker S6 JAGUAR** wavelength dispersive X-ray fluorescence (WD-XRF) is the most versatile benchtop tool available for advanced elemental analysis in both industry production and research. This high-performance spectrometer can analyze almost the entire periodic table for solids and powders.

**Elements of interest: Ti, Cr, Mn, Fe, Co, Ni, Cu, Nb, Mo, W**  
**Traces, down to ppm: Si, P, S, Cl, Ta, Pb**



BRUKER S6 JAGUAR WDXRF

## Light Element Analysis

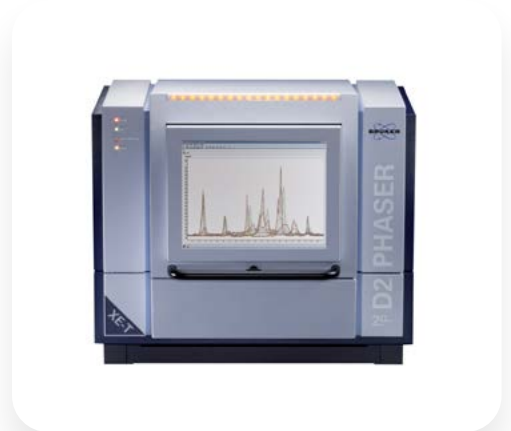
Monitor the oxygen, nitrogen and hydrogen concentrations simultaneously in metal powders in order to ensure 3D printed parts of the highest quality. The **Inductar ONH Cube from Elementar** provides reliable detection of O, N, H from trace levels to high concentrations. **The Inductar CS Cube from Elementar** is the ideal instrument for rapid and precise carbon (C) and sulfur (S) analysis in solids, especially with metals and other inorganic materials.



ELEMENTAR INDUCTAR ONH CUBE

## Crystalline Phases

The respective crystalline phase composition and structure is of utmost importance when it comes to product quality and process control. Applications range from the validation of precursor feedstock of metal powders and binders to the quantification of injection molding mixtures. Issues with dimensional stability are not only the consequence of macroscopic issues, but may also be due to an improper phase composition and structure. The **Bruker D2 PHASER** benchtop X-ray Diffractometer (XRD) with LYNXEYE XE-T provides comprehensive phase identification, quantification and microstructural characterization.



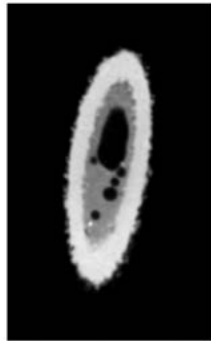
BRUKER D2 PHASER XRD

## Inspection and Failure Analysis

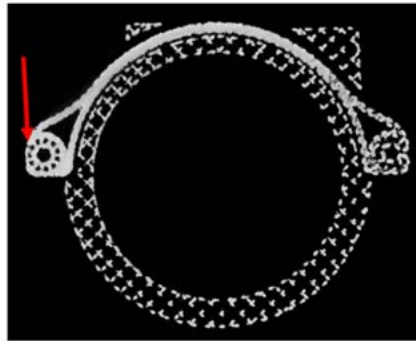
Benchtop X-ray Microscopy (XRM) provides powerful, high-speed, high-quality 3D images of products and devices. It is nondestructive, requires minimal to no sample preparation, and offers Push-Button-CT™ automated operation.



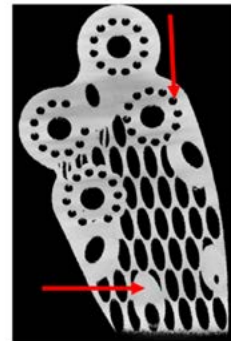
ADDITIVE MANUFACTURED  
PURE AL POWDER PART



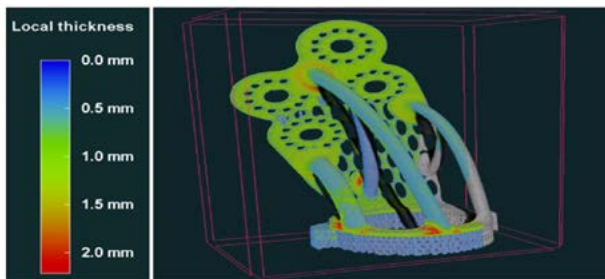
AIR BUBBLES  
RESIDUAL POWDER



LAYER DISCONTINUITIES



IMPURITIES  
IMPERFECTIONS



CALCULATION AND VISUALIZATION OF STRUCTURE THICKNESS



CAD COMPARISON WITH VGSTUDIO MAX

## Applications for Benchtop XRM Solutions

- **Powder selection & quality control** – Get extensive information about metal powder attributes that impact the final printed part
- **Post-print inspection** – Quantitative identification of volume porosity & inclusions and printing defects
- **Finished part inspection** – Verify no defects induced by post-print processes like machining & surface finishing
- **Process development & failure analysis** – Identify cracks, voids, inclusions, and defects at the surface, within the bulk material and at the interface between materials



SKYSCAN 1275 HIGH-THROUGHPUT DESKTOP 3D X-RAY MICROSCOPE

## Take Your Materials Analysis Further

For companies involved in industrial processes from R&D to Production, additive manufacturing opens up a whole new world of possibilities. But it also requires rethinking your approach to areas like design methods, choice of raw materials, integrating testing with production and defining new acceptability criteria.

With the push towards lighter, more durable products created with AM technology, supply chains need to ensure that their products meet or exceed physical and chemical specifications. Let us help you take your materials analysis further with best-in-class analytical instrumentation that you can count on.



## Expand the boundaries of your science

Quantum Analytics is a value-added distributor of analytical equipment, offering of customized technical services, including cross-platform system integration, installation, training and support. Whether you are starting up a new lab or expanding your testing capabilities, we are here to help you take your science to new levels.

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