

## Hot – Cold – Dangerous & Sensitive Test Objects

### Solutions for challenging NDT-tasks

**There are situations in which you can't or simply don't want to touch or get close to your test object. Contactless Non-Destructive Testing (NDT) solutions are the methods of choice for such challenging tasks in quality testing, material characterization and analytics. Laser ultrasound (LUS) is perfectly suited for the analysis of the internal structure of difficult samples like red hot glowing metals, frozen solids, radioactive parts and surfaces sensitive to water or other coupling agents. If chemical parameters are of interest, our spectroscopic technologies, such as Infrared (IR) and Raman spectroscopy will be appropriate for many applications with hazardous substances and where remote sensing is preferred.**

LUS offers several benefits compared to conventional ultrasonic testing. The ultrasonic waves are generated and detected by lasers which enables contactless testing without the need for a coupling agent or water. This is of high interest for the investigation of hot samples like in the metal producing and processing industry to help saving time, energy and waste. LUS also enables broadband measurements, which allow high-resolution detection of flaws, delaminations and cracks or monitoring of microstructure evolution during thermomechanical treatments, see Fig. 1 (left), while the properties of the metal's oxide layers can be characterized by infrared spectroscopy.

When interested in chemical rather than physical parameters, one can rely on IR or Raman spectroscopy, offering similar benefits, such as remote and contactless measurements. Furthermore, inline measurements can be conducted, thereby avoiding manual handling of samples. This is particularly advantageous when working with toxic substances or sensitive processes (Fig. 1, right).

The contactless nature of both, LUS and spectroscopic technologies, opens the opportunity for small- and large scale automated in-line measurement- and process analysis systems.

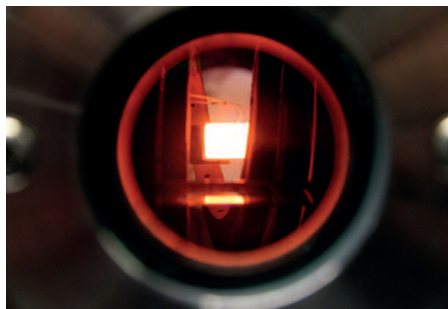


Fig. 1: Left: Glowing steel sample in thermomechanical deformation system for microstructure analysis with LUS. Right: Spectroscopic methods can replace manual handling of samples, which is of particular interest when working with toxic samples or sensitive processes. RECENDT has demonstrated such applications in the PAC-project. Photo credits: Sandoz GmbH.

### Facts/Key-Values/ Features & Benefits

- Non-destructive/non-contact
- In-line automation possible
- Flaws and structures in many solids
- Material properties
- Chemical analysis
- Physical characterization

### Potential Users Fields of Application

- Metal production and processing (casting, rolling, joining)
- Composite material manufacturers (CFRP, GFRP, injection molding, ...)
- Chemical- and pharmaceutical industry

### Status – what do we offer?

- Measurements and analysis in RECENDT-labs
- Development of methods to solve your specific problems
- Development of customized systems for your lab or fab
- Multivariate data analysis and chemometric modelling for spectroscopy

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