



Advanced semiconductor metrology using picosecond laser ultrasonics

Chromacity Ltd

reports how its Chromacity 520 femtosecond laser system is being used for rapid, non-contact, non-destructive characterisation of semiconductor thin films.

Picosecond laser ultrasonics,

or picosecond ultrasonics, is a technique for studying materials using high frequency acoustic pulses generated and detected by ultrashort optical pulses typically <1 ps in duration. The technique can be used to characterize materials with nanometre spatial resolution making it a 'go to' technique for accurately measuring the thickness of semiconductor thin films.



Image captions: A typical picosecond ultrasonics set-up for characterizing semiconductor thin films using a Chromacity 520 femtosecond laser system

Using this technique -

semiconductor device developers can determine the quality of the bonding between a film and a substrate, which gives information about a device's mechanical properties. This information is critical as the overlay and alignment of a lithographically defined pattern on top of an underlying layer is fundamental to device performance. The picosecond ultrasonic technique is particularly valuable to semiconductor device production flows where there may be an opaque layer that interferes with the measurement. In such cases, conventional methods of alignment using light fail.

The Chromacity 520

is a robust and reliable 520 nm femtosecond laser system that can be used as a fixed wavelength source to deliver ultrashort pulses with high average powers in the green spectral region. This compact, high-performance laser does not require water cooling and comes with a simple user interface, making it one of the easiest and affordable laser sources to operate. The compact housing of the Chromacity 520 enables simple system integration.



To learn more about advanced semiconductor metrology using a Chromacity 520 femtosecond laser system, please visit <https://chromacitylasers.com/wp-content/uploads/2023/03/Ultrasonic-Technologies-for-Advanced-Metrology-Digital.pdf>

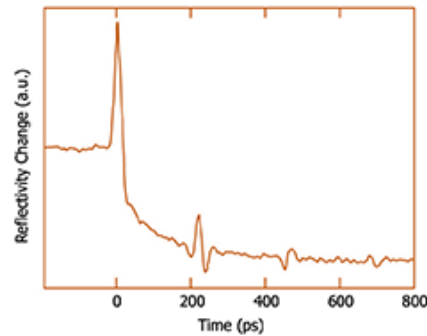


Image captions: B: Example of acoustic echoes detected in a film of As₂Te₃ if thickness 2200 angstroms. These echo signals can provide a high-resolution measurement of the thickness of the layer

For further information

please contact Chromacity Ltd. on +44-131-449-4308 / sales@chromacitylasers.com.

Chromacity Ltd.

is a world leader in the design, development, and manufacturing of advanced ultrafast pulsed fibre lasers. Based in Edinburgh, UK, the company specialises in fixed wavelength femtosecond and picosecond optical parametric oscillator (OPO) based tuneable laser systems. Based on a novel patented laser architecture that delivers ultra stable long-term performance, the fixed wavelength femtosecond fibre lasers work at 1040nm and 920nm, and the tuneable picosecond OPO lasers work across the near infra-red and mid infra-red wavelengths from 1.4um to 12um. Lasers from Chromacity Ltd. are simple to use, with no specialist support required to operate them – you turn them on, configure and use. These compact, air-cooled devices offer unrivalled long term pulse stability without the need for on-going maintenance.

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