Contactless Resistivity Mapping System

EU-ρ-μτ SCAN

CONTACTLESS RESISTIVITY & CHARGE CARRIER MOBILITY LIFETIME MAPPING OF HIGH RESISTIVITY SEMICONDUCTOR WAFERS (GaN, GaAs, InP, CdTe, CZT, etc…)

The EU-ρ-μτ SCAN is a high performance instrument for the characterization of high resistivity semiconductor wafers. It operates without any physical contact with the wafer and no deposited conductive layer on it.

The spacial resolution of the measurements can be selected by the operator from 0.5 mm to a desired value covering the whole wafer. Therefore it can be used for routine INDUSTRIAL control as well as by material developing LABORATORIES. No high qualified operators are necessary.

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www.eurorad.com
info@eurorad.com

EU-ρ-μτ SCAN

The instrument integrates automatically full wafer mapping of both :

*** RESISTIVITY**

*** CHARGE TRANSPORT properties**

It can be delivered in two configurations depending on the resistivity range of interest :

*** resistivities in the range 10^5 to 10^8 Ω cm, for materials like GaAs or InP …**

*** resistivities from 10^6 to 10^{11} Ω cm for GaN , CdTe , CZT , SiC …**

The characterisation of semiconductor wafers is an essential step in device production. Absolute values as well as uniformity of RESISTIVITY and MOBILITY LIFETIME give precious information on the quality of wafers and therefore the devices.
Performing these measurements without any direct contact with the wafers is important too, to reduce any possible contamination.

The EU–ρ–μτ-SCAN is, to our knowledge, the first commercially available instrument incorporating two measurement systems in one, i.e. (i) the resistivity mapping and (ii) the μτ products (electrons and holes) mapping.

EU-ρ–μτ-SCAN instrument uses a contactless methods for material characterisation, i.e. avoiding the problems connected with the fabrication of ohmic contacts for test evaluation, it allows the examination of wafers without degrading surface quality.

OPERATION PRINCIPLES :

- For the resistivity mapping the sample is placed into a capacitor as a lossy dielectric substance and the resistivity is evaluated by measuring a time dependent charge transient.

- The same system allows safe measurements of charge carrier mobility lifetime products (electrons and holes) by using the embeded laser beam module instead of the commonly used alpha radioactive sources for such measurements.

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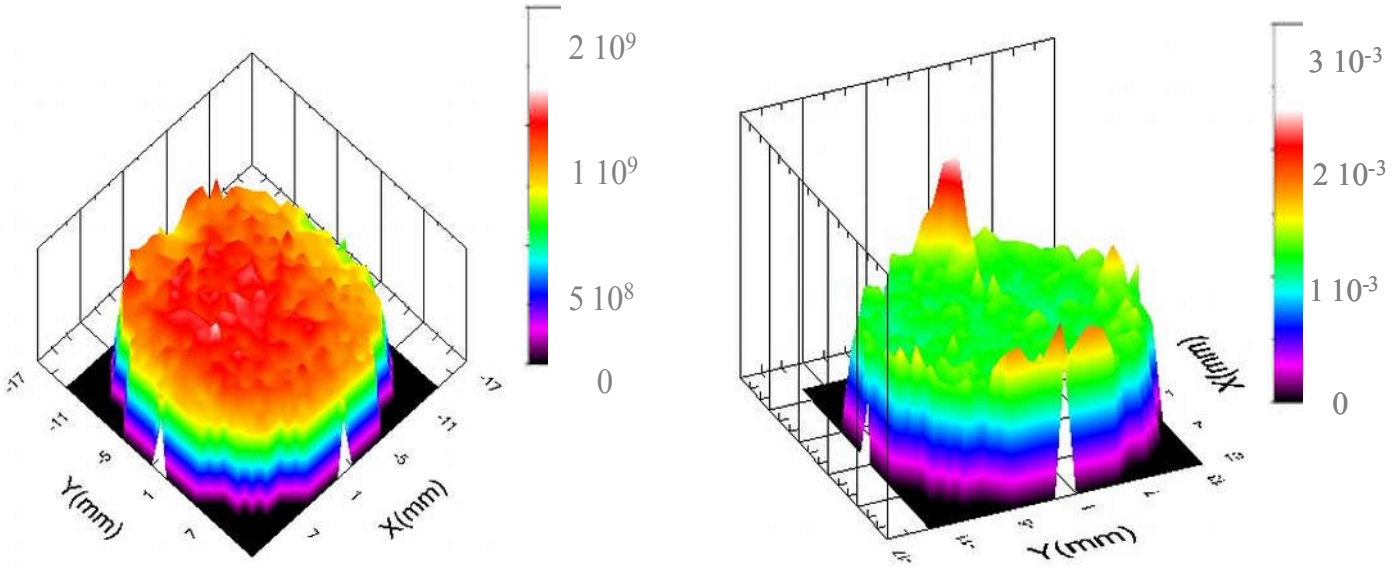
MATERIALS TO BE CHARACTERISED

HIGH RESISTIVITY SEMICONDUCTORS	RESISTIVITY DOMAIN	μτ DOMAIN	WAFER SIZE
EXAMPLES :	10^5 – 10^{11} Ωcm as standard From 10^3 Ωcm On request	10^{-6} – 10^{-1} cm^2/V	Up to ∅ 150mm Minimum thickness: 0,5mm
Gallium Nitride (GaN)			
Gallium Arsenide (GaAs)			
Cadmium Telluride (CdTe)			
Cadmium Zinc Telluride (CdZnTe)			
Cadmium Manganese Telluride (CdMnTe)			
Indium Phosphide (InP)			



Real time resistivity (left) & electron mobility (right) mapping of a semi insulating CdTe wafer (∅ 32mm)

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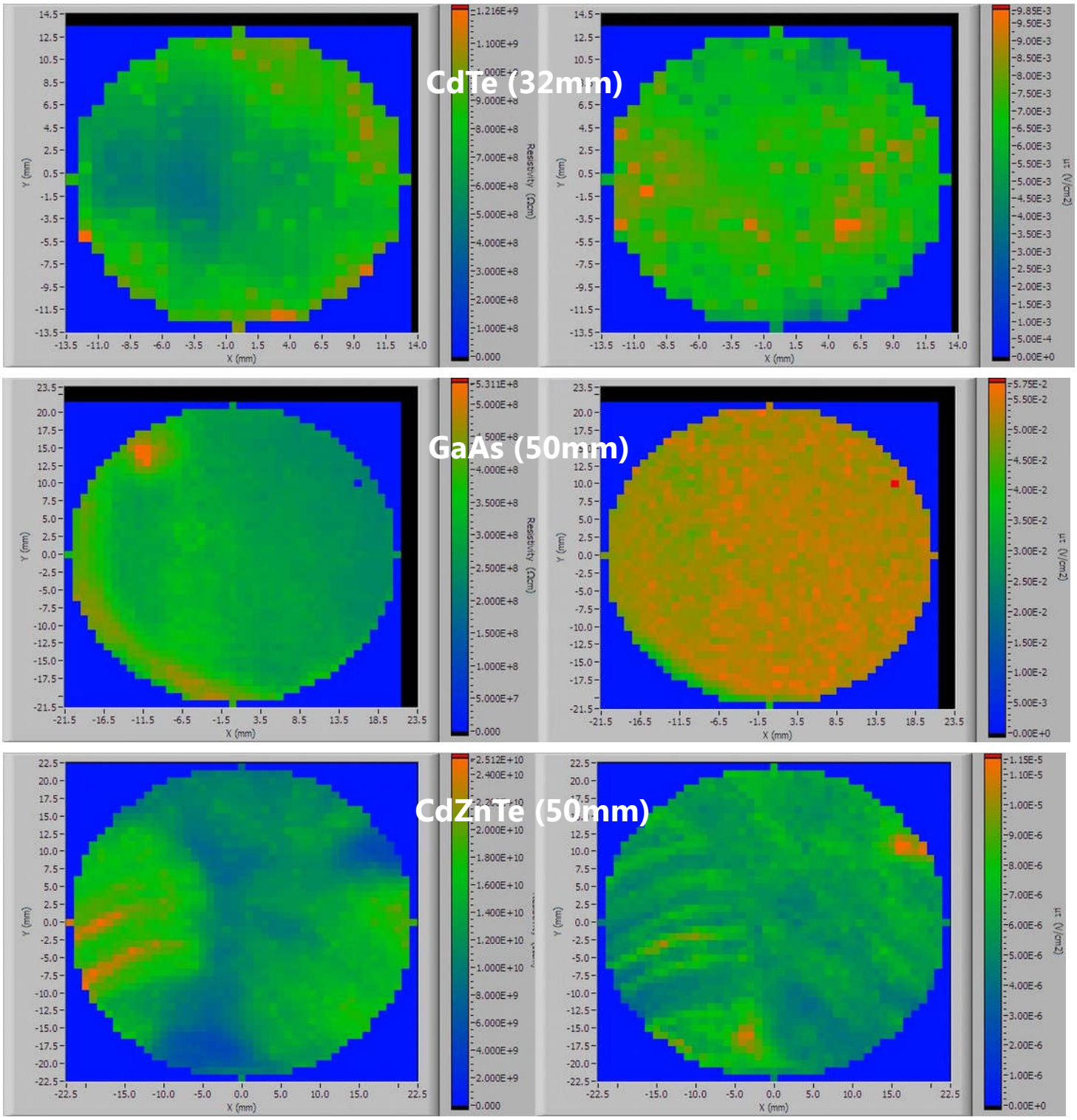

Colour coded resistivity, ρ (left) & electron mobility, $\mu\tau_e$ (right) mapping

SYSTEM INCLUDES :

- Measurement unit, detection head and necessary hardware & electronics including PC unit with the software developed for resitivity and μτ measurements
- User manual

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