



MDPpro

Mono- and Multi-crystalline wafer and brick lifetime measurement device

for routine quality control and sophisticated material research & development

Si | compound semiconductors | oxides | wide bandgap materials | perovskites | epitaxial layers

[CdTe | InP | ZnS | SiC | GaAs | GaN | Ge]



Routine Lifetime Measurement Quality Control & Inspection

Best throughput: >240 bricks/day or >720 wafers/day

Measurement speed: <4 minutes for a 156 x 156 x 400 mm standard brick

Range of lifetimes: 20 ns to several ms

Yield improvement: 1 mm cutting criteria for a 156 x 156 x 400 mm standard brick

Quality control: designed for quality monitoring of processes and materials like mono or multi-crystalline silicon

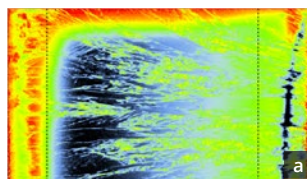
Contamination determination: metal (Fe) contaminations originated in crucibles and equipment

Reliability: modular and rugged industrial instrument for higher reliability and uptime > 99%

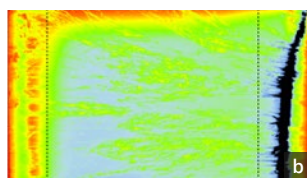
Repeatability: > 99.5%

Resistivity: resistivity mapping without frequent calibration

- + Contactless and destruction free lifetime imaging (μ PCD/MDP (QSS), photoconductivity, resistivity and p/n check according to semi standard SEMI PV9-1110
- + Wafer cutting, Furnace monitoring, Material optimization and more



a. Lifetime (τ) map of multi-crystalline Si brick with automated determination of cut criteria



b. Spatially resolved p/n conduction type transformation detection

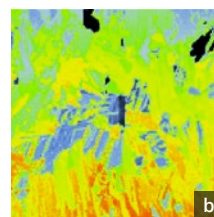
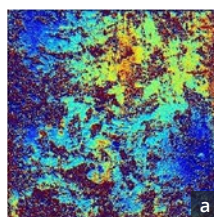


c. Resistivity map of multi-crystalline Si brick

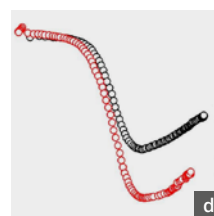
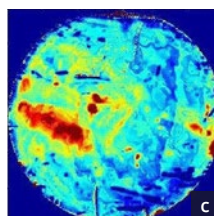
Sophisticated Material Research & Development

Few examples for research applications

- + Iron concentration determination
- + Trap concentration determination
- + Boron oxygen determination
- + Injection dependent measurements and more



a. Iron density map
b. Reflection map

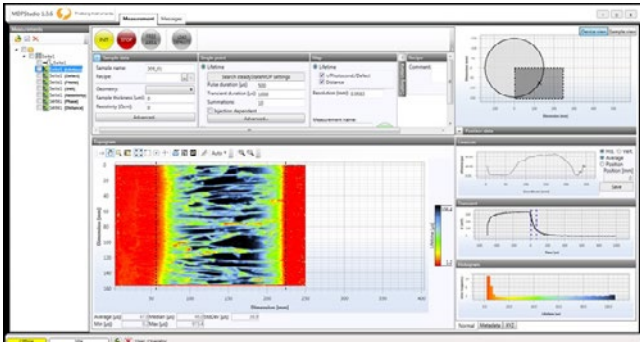


c. Relative boron oxygen, density map
d. Injection dependent lifetime curves with trapping

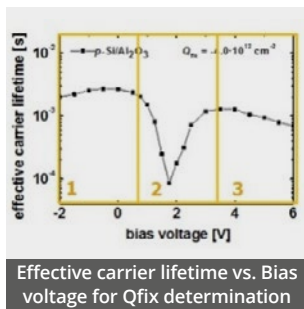
MDPStudio

User-friendly and advanced operating software with:

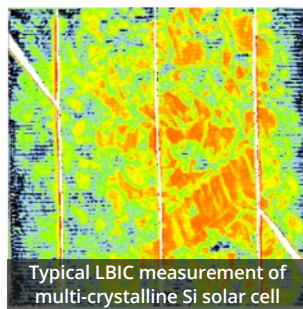
- › Export and import functions
- › User structure with operator
- › Overview over all performed measurements
- › Sample parameter input
- › Single point measurements e. g. injection dependent measurements
- › Mapping options
- › Recipes
- › Package of analysis functions
- › View of linescans and single transients



Remote accessibility: IP based system allows remote operation and technical support from anywhere in the world.



Effective carrier lifetime vs. Bias voltage for Qfix determination



Typical LBIC measurement of multi-crystalline Si solar cell

Relevant products



MDPspot



MDPmap

Configuration options

- › Spot size variation
- › Resistivity measurement (bricks/wafers)
- › Reference wafer
- › Sheet resistance
- › Background/Bias light
- › Reflection measurement (MDP)
- › LBIC
- › BiasMDP
- › LBIC, BiasMDP measurement stage with contacts
- › Internal iron mapping of Si
- › P/N detection
- › Bar code reader
- › Wide range of lasers

Technical specifications

Sample size	Brick between 125 x 125 to 210 x 210 mm ² , maximum brick length: 500 mm
	Wafer up to 300 mm diameter (standard), up to 450 mm diameter (on request), down to 5 x 5 mm
Range of lifetimes	20 ns to several ms
Resistivity	0.2 – >10 ³ Ohm cm
Conduction type	p, n
Measureable properties	lifetime - μ PCD/MDP (QSS), photoconductivity
Excitation	select up to four different wavelengths from 355 nm up to 1480 nm. 980 nm (default)
Laptop or PC requirements	Windows 7 or latest, .NET Framework update, 2 Ethernet ports
Power requirements	100 – 250 V AC, 6 A
Dimensions	1000 x 720 x 1500 mm
Weight	ca. 200 kg
Certification	manufactured under ISO 9001 guidelines, CE conform

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Strategic partner

