AESCUSOFT automation

Housing of the Multitool

IR-Multitool™ IR Camera Imaging

CDI Carrier Density Imgaging

> For Fast Spatially Resolved Lifetime Measurement of Silicon Wafers

> Non-destructive and contactless measurement

> Fast measurement time down to a few minutes or even seconds

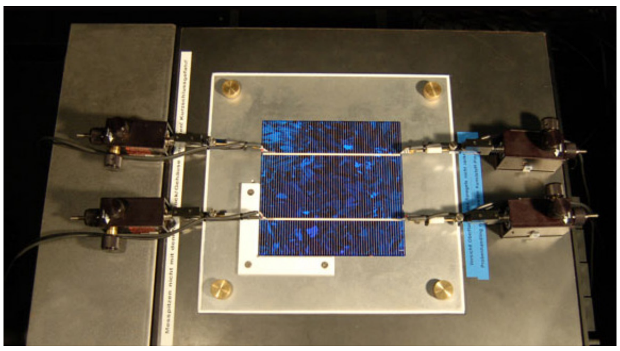
LIT Lock-In Thermography

> for Spatially Resolved Imaging of Solar Cell Power Losses

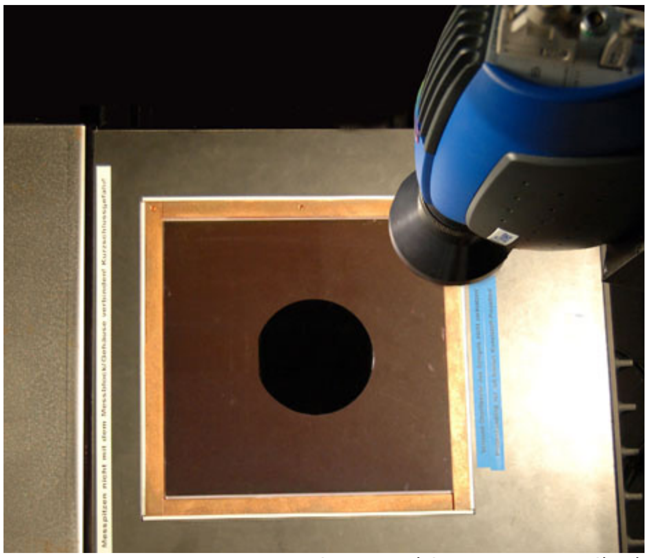
> Dark and Illuminated Lock-In Thermography

> 4-quadrant power supply

> 4-wire contacting of the solar cell



ILIT Chuck and Micromanipulator



IR Camera and CDI Measurement Chuck

General Features

> fast, high precision IR camera with high resolution , frequency up to 120Hz, 400 Hz as option

> Homogeneous laser beam irradiation (1 Sun) on large area

> Laser proof housing with security locked doors

> Cell size up to 156x156 mm2, Up to 210x210 mm2 as option

contact

Aescusoft GmbH
Emmy-Noether-Str. 2
79110 Freiburg, Germany

Fon +49 (0)761 384 3434
Fax +49 (0)761 384 3433

www.aescusoft.de
info@aescusoft.de

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automation

IR-Multitool^{TM} IR Camera Imaging

CDI Carrier Density Imgaging and LIT Lock-In Thermography

Application Area and Benefits

CDI - Carrier density imaging is a fast, spatially resolved lifetime measurement method. It is based on the principle of emission of infrared radiation by free carriers.

A high speed infrared camera (3-5 µm spectral range) with high resolution is applied for measuring the infrared emission from the sample. This overcomes the necessity of scanning the sample in order to receive laterally resolved information. Measurement times can be cut in this setup from hours to minutes or even seconds.

An additional advantage is the absence of any moving parts which may cause spatial errors or even failures in the measurement. The use of lock-in technique and an appropriate source of homogeneous large area laser beam illumination is essential to receive good results on low quality materials.

DLIT and ILIT - Dark and Illuminated Lock-In Thermography produces spatially resolved images of power losses in solar cells for identifying technological and material quality problems and realistically judging their influence on solar cell performance.

It is well known from simulations that the dark and illuminated current paths in solar cells may differ considerably. Spatially resolved images of power losses in solar cells can be measured under illumination in different modes to show different loss mechanisms:

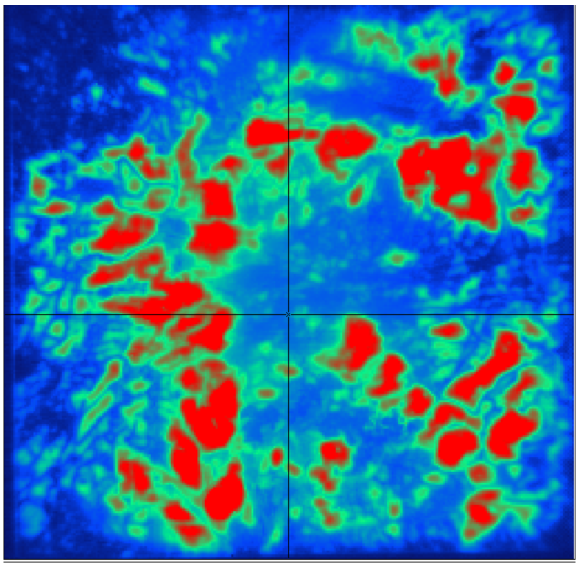
Voc-ILIT: Material quality in total

Mpp-ILIT: Total power losses

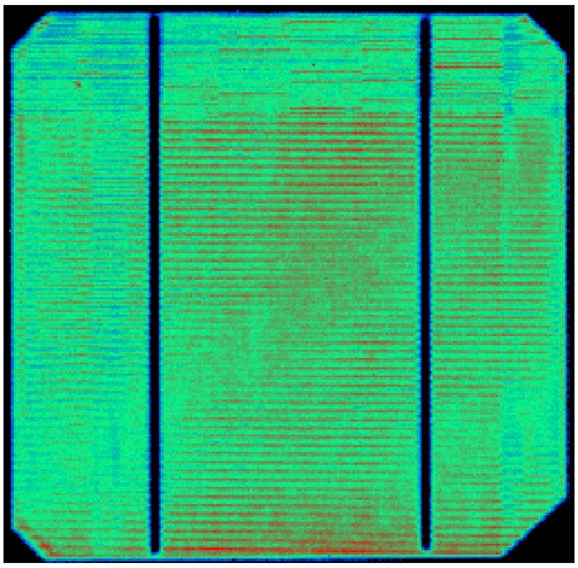
Jsc-ILIT: Contact resistance problems

DLIT: Dark leakage current

Reverse DLIT: Reverse Dark leakage current



Lifetime image of a mc silicon cell



Contact resistance problem under a grid

marketing
www.aescusoft.de

Daniel M. Spinner (CEO)
Fon: +49 (0) 171 3274596
spinner@aescusoft.de

Emmy-Noether-Str. 2
79110 Freiburg, Germany
info@aescusoft.de