

WCT-120 Photo-conductance Lifetime Tester

The system is used for carrier lifetime measurement of samples after different processing steps during solar cell fabrication, as a step by step monitoring tool. The photo-conductance based contactless measurement technique makes use of RF sensor to measure sheet conductivity of the sample and light sensor to measure intensity of the flash to which sample is exposed. These measurements are then used to calculate the effective carrier lifetime of the samples.

System Specifications

Available Measurements:

- Lifetime
- Resistivity
- Emitter Saturation Current Density
- Trap Density
- One-sun V_{OC}

Measurement Modes:

- Quasi Steady State (QSS) Mode
- Transient Mode

System Capabilities:

- Lifetime Measurement Range : 100 ns to greater than 10ms
- Resistivity Measurement Range: 3-600 ohm/sq.
- Available Bias Light Range: 0-50 Suns
- Typical Calibrated Injection Range: 10^{13} - 10^{16} cm⁻³
- Available Spectrum: White-light and IR Illumination
- Sensor Area: 40mm diameter
- Sample Size: Standard diameter- 40-210 mm. (Smaller samples can be measured).
- Wafer Thickness Range: 10-2000 μ m (calibrated). (Other thicknesses may be measured).

Facility Requirements:

- Ambient Operating Temperature: 20°C-25°C
- Power Requirement:
 - WCT-120 : 40 W
 - Computer with Monitor: 200 W
 - Light Source: 60 W
- Dimensions: 22.5 cm (W) X 28 cm (D) X 57 cm (H)



Location : NCPRE characterization lab, IIT-B

Suns V_{OC} Stage

The principle of Suns- V_{OC} technique is to measure the open circuit voltage as a function of light intensity. The Suns V_{OC} measurement can be performed on the samples with P-N junction and it is essential to be able to make contacts on both the sides of the junction. Being an open circuit measurement, it is free from effects of series resistance and hence can be used to characterize shunting. Also comparison of the Suns V_{OC} curve (or implied I-V curve at open circuit voltage) with the final I-V curve can give an idea about series resistance.

System Specifications

Available Measurements:

- Open circuit voltage V_{OC}
- Pseudo efficiency
- Pseudo fill factor
- Two diode Analysis
- Shunt Value

System Capabilities:

- Typical Calibrated Illumination Range: 0.006-6 Suns
- Wafer Size: 210 mm diameter/side

Facility Requirements:

- Chuck temperature control : 25°C
- Ambient Operating Temperature: 18°C-25°C
- Power Requirement:
 - Computer with Monitor: 200 W
 - Light Source: 60 W
- Dimensions: 32 cm (W) X 28.5 cm (D) X 75 cm (H)



References:

- Sinton Manual for WCT-120 Photo-conductance Lifetime Tester and optional Suns V_{OC} stage
- Product Notes for Lifetime tester and Suns V_{OC} Measurement on <http://www.sintoninstruments.com>

Location : NCPRE characterization lab, IIT-B

