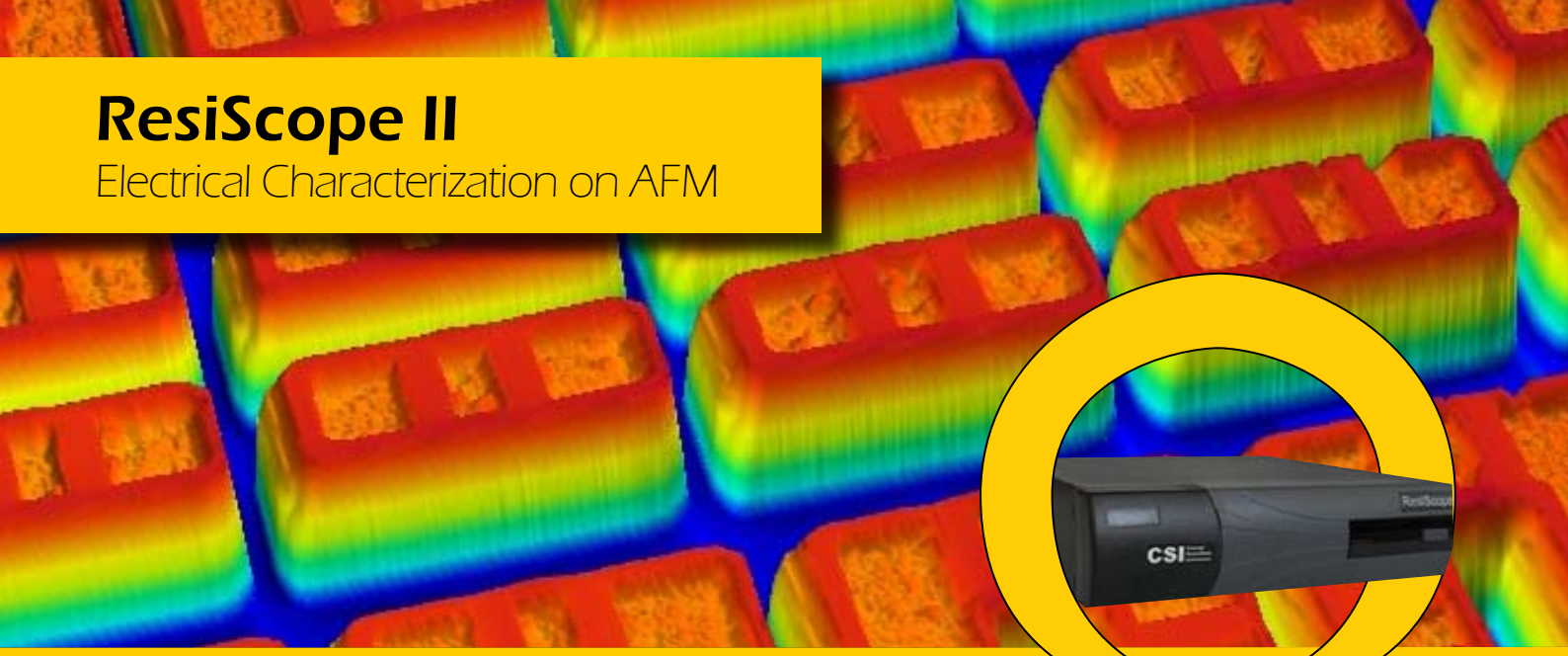
ResiScope II
Electrical Characterization on AFM



ResiScope II
AFM Electrical Characterization

The ResiScope II is a unique system able to measure Resistance over 10 decades with a high sensitivity and resolution. It can be combined with several dynamic modes as MFM/EFM or KFM single pass providing several sample characterizations on the same scan area.

The measurement is made by applying a DC bias between the sample and a conductive AFM probe (tip at virtual ground). The tip is scanned in contact mode using the laser deflection for the AFM feedback . As an independent measurement, the ResiScope II measures the sample resistance through the High Performance Amplifier (HPA). The sample is scanned byt the probe in contact mode using the laser deflection for the AFM feedback

What is ResiScope ?

A dual measurement system :

- Resistance measurement
- Current measurement (& IV spectroscopy)
- Compatible with
  - Oscillating mode (Tapping / AC mode)
  - EFM/MFM or Single-pass KFM
- Resistance 10_2 ohms to 10_{12} ohms (10 decades dynamic)
- Output information :
  - R
  - Log R
  - Current & I/V Spectroscopy

The Best AFM experience

Resicope combined with the Nano-Observer AFM will deliver the best AFM electrical characterization result.

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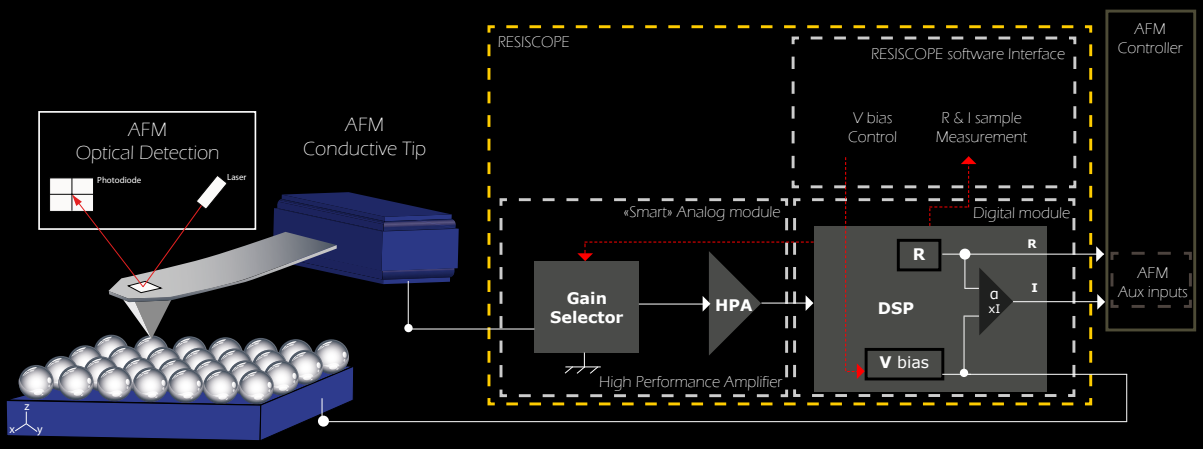
CSI Concept Scientific Instruments

ResiScope Principle

During the measurement, the DSP chooses in real time the best gain to optimize the measurement made by the amplifier module (HPA). This operating condition allows a very high sensitivity on all the range of resistivity at a regular scan speed (AFM) . Contrary to other techniques, the current between the probe and the sample is strongly reduced. This has the result of limiting the local effect of oxidation or electrochemistry and protecting the conductive probe from high current damage.



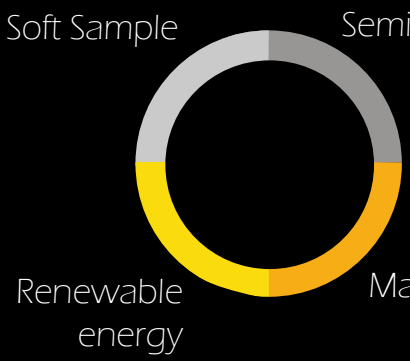
ResiScope is a smart real-time control of the appropriate ranges to obtain the best measurement (sensitivity and range). It limits the current through tip and sample is limited to prevent any damage. It is more than a simple linear or Log amplifier used for a basic current measurement

ResiScope II Awards

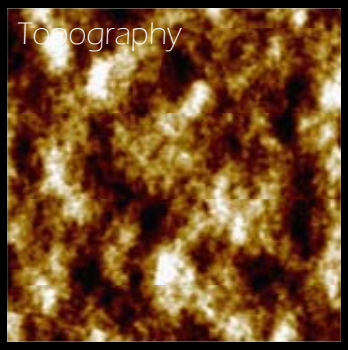
- « Yves Rocard 2014 » prize
- FIEEC prize For Applied Research at « RDV Carnot 2013 »

“ The World’s Greatest Performance for AFM Electrical Characterization

Applications



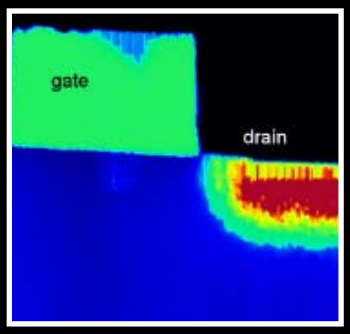
» Renewable energy



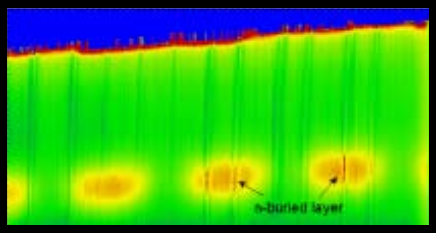
Organic Solar Cell sample,

Sample shown as image across the sample layer

» Semiconductors

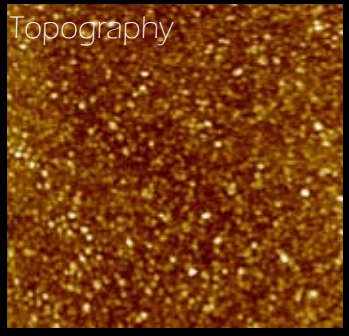


PMOS-transistor, scan size 1.5 µm

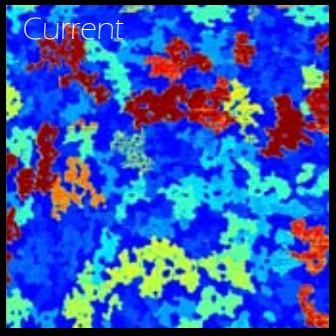


n-Buried layer, scan size 7 µm

» Materials



50 Å gold deposition on doped silicon

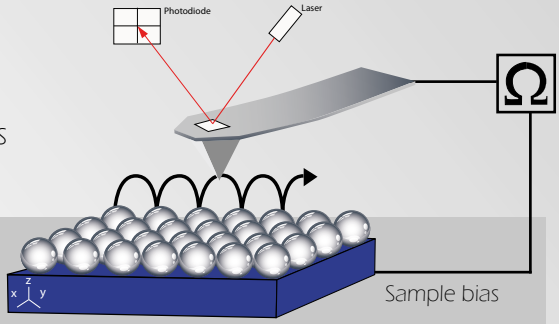


Soft ResiScope Mode
True Quantitative Resistance/ Current Measurements

» Intermittent Contact

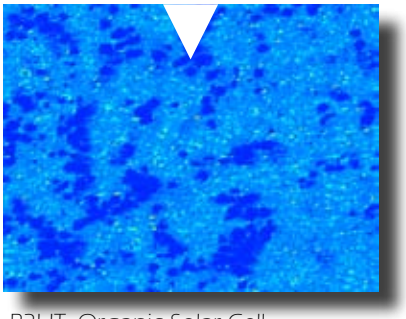
This unique and innovative AFM mode is able to expand the fields of applications of the « ResiScope II » to soft samples such as organic solar cells, conducting polymers or other biological samples, while retaining its wide measuring range (10 decades).
The Soft ResiScope principle is based on intermittent contact. The lack of friction and the constant force of the tip on the sample provide quantitative measurements without damaging the surface of delicate samples.

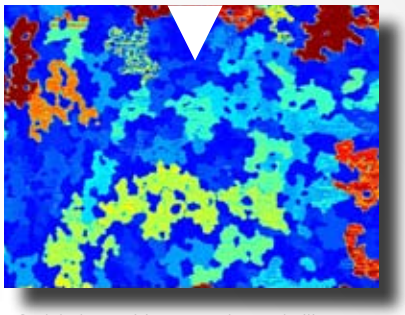
- Unique Technology
- NO Friction
- Constant Force = Quantitative Electrical Measurements

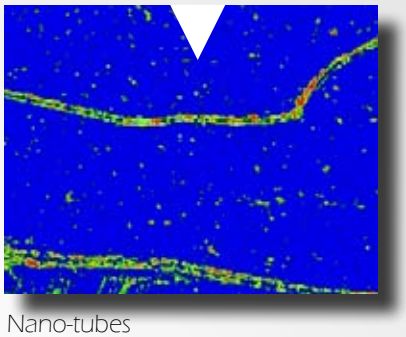


“ Soft ResiScope : Electrical characterization on soft sample

» Preserved performance & sample


P3HT, Organic Solar Cell


Gold deposition on doped silicon


Nano-tubes

Specifications

Resistance range	10^2 Ω to 10^{12} Ω
Current range (estimated current)	50 fA to 1 mA
AFM compatibility	CSInstruments : Nano-Observer UHV : please contact us
Compatible AFM mode	Contact / Tapping / AC mode, EFM / MFM / KFM
Operating Environment	Windows® XP/ window 7 (32/64 bits) Framework
Power Supply	AC 100-240V 47-63Hz, 1A The appliance must be properly grounded.
Interface	USB (2.0 - 3.0 compatible)

More information about ResiScope II

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