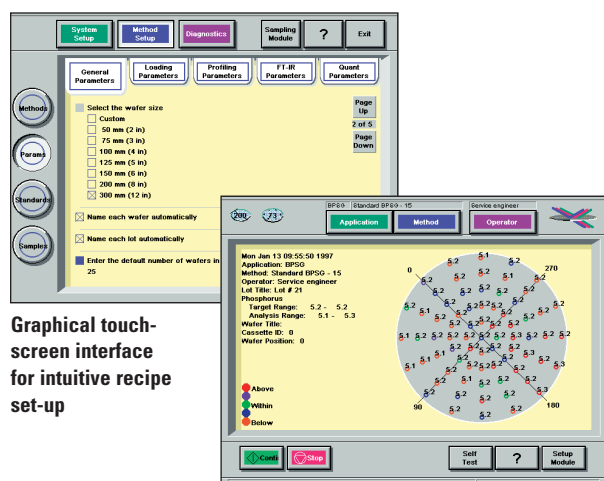
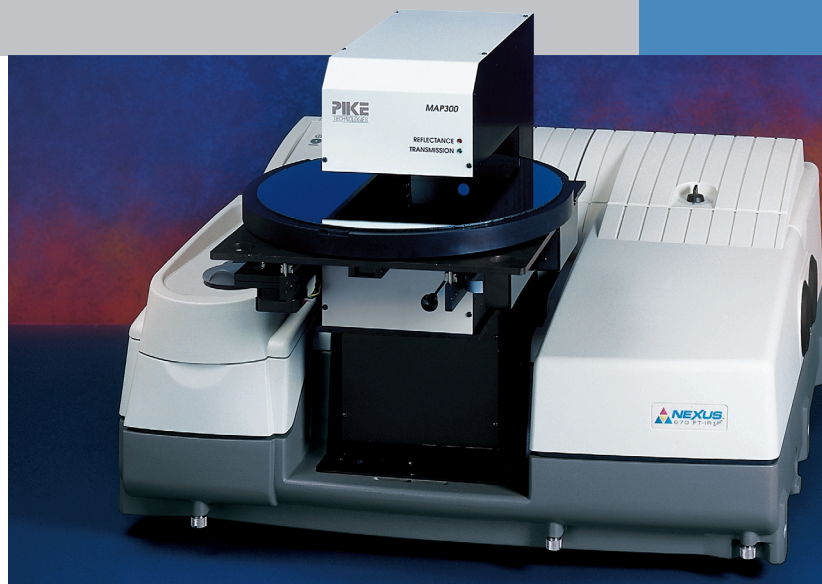


The Nicolet ECO®/RS is a research FT-IR system dedicated to semiconductor wafer analysis. Founded on the powerful Nicolet Nexus® FT-IR spectrometer, the Nicolet ECO/RS is ideally suited to meet the needs of semiconductor researchers and production method development groups.

Nicolet ECO/RS Semiconductor Wafer Profiling System

Expanding your research capabilities in semiconductor applications



Graphical touch-screen interface for intuitive recipe set-up

Data presentation options include wafer maps and SPC charts

The Nicolet ECO/RS includes a completely integrated wafer profiling stage and the well-known Nicolet ECO FT-IR metrology software toolkit, so wafer analysis can progress quickly and smoothly. The system software includes analysis methods for the most common semiconductor measurements, and more powerful software can be added for quick, easy development of methods for new or unique applications.

Fabs have the flexibility to use the Nicolet ECO/RS for many different measurements because it can be equipped to measure wafers ranging from 50 mm to 300 mm, as well as irregularly shaped pieces of wafers. The system also supports single point analysis, multi-point analysis and unattended complete wafer profiling.

Standard Applications Supported by the Nicolet ECO/RS

- Thickness measurements
 - Epitaxial films, MEMS devices, SOI, polysilicon, and III-V films
 - Interferogram subtract method for thick films
 - Cepstrum method for thin films
- Interstitial oxygen and substitutional carbon levels in silicon
 - Support for ASTM, JEIDA, and DIN methods
- Dielectric film characterization
 - Dopant concentrations in BPSG, PSG, and FSG films
 - Hydrogen concentrations in SiN and SiON films

Support

Thermo Electron Corporation backs Nicolet ECO tools with a global support organization of over 100 professionals trained to provide the widest range of solutions available. Unprecedented product warranties, educational courses, and products allow us to completely support your needs.

Nicolet ECO/RS Hardware Features

- Transmission and reflection measurement modes
- Manual wafer loading
- Unattended wafer profiling
- Auto-alignment and dynamic alignment of interferometer
- High power Ever-Glo™ source
- Optics optimized for wafer analysis

Nicolet ECO Software Features

- Easy-to-use, easy-to-learn interface
- Designed for convenient touchscreen use
- Three levels of security
- Atmospheric interference correction
- Custom application development package
- Multiple quantitative algorithms including linear regression, classical least squares (CLS) and partial least squares (PLS)
- Easy transferability of results to other Windows® packages for reporting and presenting

System Configurations

You can choose from two configurations of the ECO/RS that offer all the capabilities described above.

Nicolet ECO/RS 300 – This configuration is capable of running wafer sizes up to 300 mm in diameter.

Nicolet ECO/RS 200 – This configuration is capable of running wafer sizes up to 200 mm in diameter.

Wafer Profiler – The Wafer Profiler is a module that offers an alternative to the Nicolet ECO/RS for owners of a Nicolet Nexus or Magna-IR® FT-IR spectrometer. This module offers all of the functionality of the Nicolet ECO/RS 300 in an external sampling module that can be fitted to a new or existing Nicolet Nexus or an existing Magna-IR system. The end result is an enhanced FT-IR system with a unique and powerful dedication to semiconductor wafer analysis.

FACILITY REQUIREMENTS

Power	110V/60 Hz – 220V/50 Hz
Source	Thermally stable, high-energy Ever-Glo mid-IR source
System Purge	Dry air or nitrogen

PHYSICAL CHARACTERISTICS

Instrument	
Height	55 cm
Width	55 cm
Depth	62 cm
System Weight	100 Kg

OPTICAL

Spectral Range	4800 – 400 cm ⁻¹
Resolution	0.5 cm ⁻¹
Beam Diameter	6.0 mm
Analysis Angle	15°

AUTOMATION

Standard Wafer Sizes	ECO/RS 300: 50 – 300 mm ECO/RS 200: 50 – 200 mm
Precision	± 1.0 mm

APPLICATION SPECIFICATIONS

Epitaxial Thickness		
Range	0.25 – 750 µm	
Precision	± 0.02 µm	
Accuracy	± 0.05 µm	
Carbon & Oxygen in Silicon	Carbon	Oxygen*
Range	0.4 – 10 ppmA	0.4 – 40.0 ppmA
Precision	± 0.2 ppmA	± 0.1 ppmA
Accuracy	± 0.2 ppmA	± 0.2 ppmA

*All oxygen values reported using ASTM 1979 calculations.

Boron & Phosphorus in BPSG or PSG Films	Boron	Phosphorus
Range	1 – 10 Wt%	2 – 12 Wt%
Precision	± 0.05 Wt%	± 0.05 Wt%
Accuracy**	± 0.15 Wt%	± 0.25 Wt%

** Accuracy figures represent the standard error of prediction for the PLS method.

Hydrogen in Silicon Nitride	Si-H	N-H
Range	3 – 30 Atom%	3 – 30 Atom%
Precision	± 0.3 Atom%	± 0.3 Atom%
Accuracy***	± 0.5 Atom%	± 0.5 Atom%

*** Accuracy figures are relative to published literature values used for calibration



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