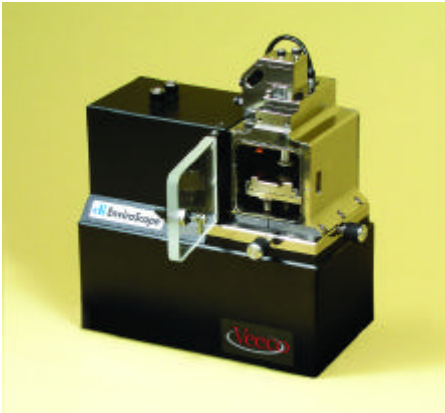
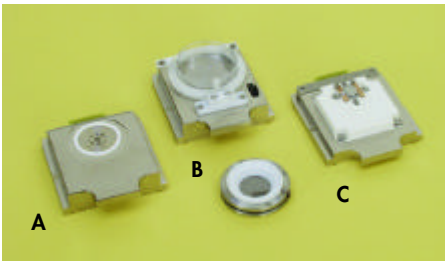


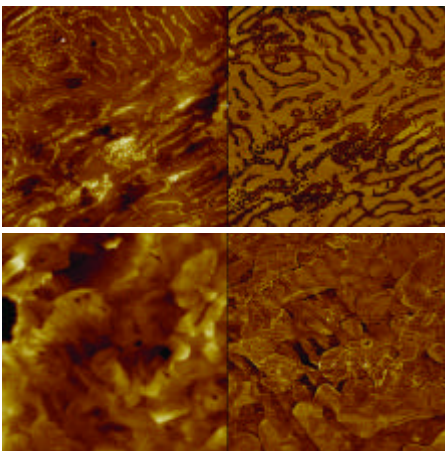
## di EnviroScope Atomic Force Microscope



EnviroScope Atomic Force Microscope.



EnviroScope modular stages. A) standard, B) fluid/heater, C) high temperature heater.



Topography image

Phase image

Solder surface in vacuum. Top image is 22°C, bottom image is 130°C. 5µm scan size.

The new Digital Instruments EnviroScope™ combines a hermetically sealed sample chamber with the world's leading scanning tip atomic force microscope. High vacuum, gas, or liquid, as well as heating can be introduced into the system's environmental chamber so users can observe sample reactions to a variety of environmental changes while scanning. The EnviroScope comes standard with contact AFM, TappingMode™ AFM, Phasemaging™, magnetic force microscopy (MFM), and other imaging modes to deliver all-purpose application flexibility to research and industrial facilities.

### Advanced Environmental Capabilities

With advanced environmental capabilities and user-friendly Digital Instruments AFM technology, the EnviroScope is specifically designed to be a high-performance tool for research in material science, electrochemistry, polymer technologies and other applications.

The EnviroScope allows imaging of sample characteristics as a function of environmental changes. The chamber can be purged with inert gas to slow or inhibit reactive processes and reduce moisture effects.

The EnviroScope has an optional all-in-one turnkey vacuum system. The turbo pump is mounted to the custom isolation table for direct access to the AFM and the roughing pump can be remotely positioned to ensure no interference during imaging.

The EnviroScope easily enables environmental experiments with optional modular sample stages and an exclusive cantilever replacement tool.

The fluid/heater stage allows gas and/or fluid to be injected around the sample via the system's ports for observation of growth, etching, or corrosion in ambient and elevated temperatures.

For temperature-sensitive applications, the EnviroScope provides a high temperature stage for observing reactions or crystallization during mild or drastic temperature changes over time. Software specially designed for the sample heating system allows programmable image acquisition linked to temperature for multiple image thermal experiments.

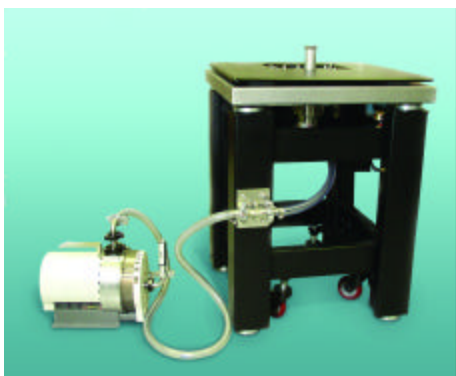
The EnviroScope is also an effective AFM system for electrochemistry applications in liquid environments. An electrochemistry option specifically designed for the EnviroScope allows precise software controlled sample temperature. Combined with a sealed sample chamber, the EnviroScope allows gas flow above the electrochemistry fluid cell for sample bath evaporation and chemistry control. Studies of interest include corrosion, etching, electro-plating, electro-adsorption, and electro-desorption.

### Proven, Standard-Setting Components

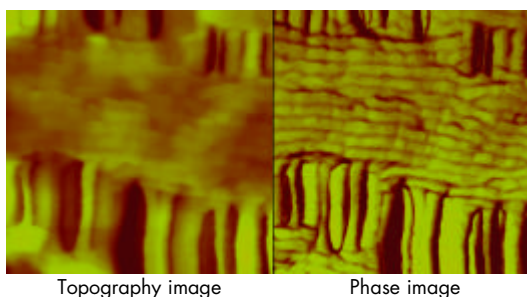
The EnviroScope scanner, based on the industry-leading Dimension AFM head, includes a conformal coating

for protection from environmental changes in the chamber. The scanner utilizes patented TrakScan™ technology to ensure that the laser beam reflects from the same spot on the AFM cantilever during raster scanning. The head also maintains the extremely low noise levels essential for resolving single atomic steps and measuring sub-Angstrom surface roughness on ultra-smooth surfaces.

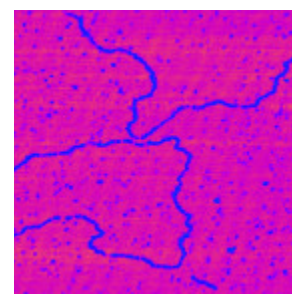
The EnviroScope can be shipped with either the Digital Instruments NanoScope® IIIa or next-generation NanoScope IV controller. The NanoScope IIIa's time tested design offers Digital Instruments' famous control, resolution and noise levels. The NanoScope IV offers additional features like built-in Quadrex phase imaging, Q control, and fast scanning. Using either controller, the EnviroScope can scan from 90 microns X-Y and 5 microns in Z with full, 16-bit resolution on all scan waveforms and on each axis.



Turnkey vacuum system.



Celgard Polymer in ambient environment.  
400nm scan size.



DNA image in fluid at 37°C.  
800nm scan size.

## Preliminary Specifications

- Sample Stage Range:** – 6mm X-Y and 14mm Z sample movement range while maintaining vacuum
- Sample Size:** – 30mm X-Y; 12mm Z
- Sample Leveling:** – Automatic mechanical
- Temperature Range while imaging:** – • 185°C in ambient environment  
– Ambient to 300°C in vacuum  
– Ambient to 60°C in fluid (including EC)
- Temperature Stability:** – ±1°C
- Scan Size:** – 90µm X-Y; 5µm Z
- Noise Level:** – <0.05nm at ambient pressure\*\*
- Linearity:** – Software-corrected
- Optics:** – Integral top-view video microscope  
– Fixed ~0.5mm field of view at the sample
- Ports:** – Gas purging, vacuum or interface plate for user customization
- Electronics Controller:** – Digital Instruments NanoScope IIIa with Quadrex or NanoScope IV
- Imaging Modes:** – Fluid\*, Contact, Tapping, Phase, EC AFM\*, FFM/LFM, MFM, Nano-Indentation\*\*
- Vacuum Level\*:** – 10<sup>-5</sup> Torr

\* Requires optional purchase.

\*\* In appropriate environment.

**Note:** Performance specifications are typical and subject to change without notice.

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