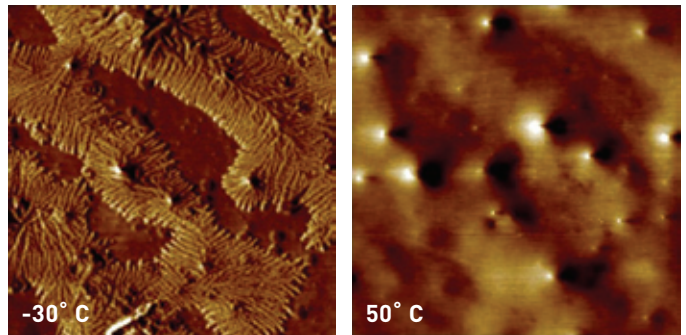


Dimension AFM Heater and Cooler Accessories

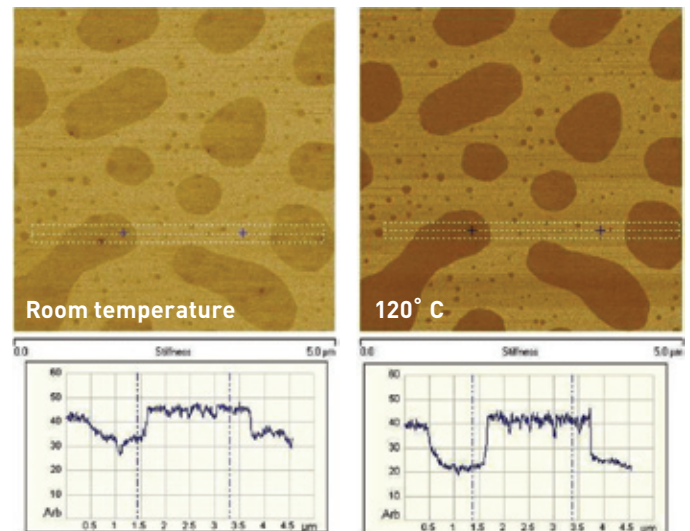
Closed-loop scanning in controlled environment for thermal analysis

Veeco's Dimension™ Heater and Cooler Accessories enable atomic force microscopy (AFM) to be performed down to -35°C and at elevated temperatures up to 250°C , with precise control while stepping or cycling through thermal ranges.

- Auto Z-motor function control provides continuous tip/sample positioning while heating
- Closed-loop controlled operation enables accurate surface tracking during thermal cycling of samples
- Software temperature control for heater, cooler and tip maintains thermal equilibrium and precise measurements
- Low-volume environment enables precise gas-flow control to avoid oxidation when heating sample or ice formation during cooling
- Flexible platform enables almost every AFM experiment or test while temperature cycling samples



Dimension AFM 12 x 12 micron phase images of PDES sample: structure over temperature cycle of 80°C demonstrate tracking, crystal formation at -30°C and material transition to amorphous state above mesomorphic transition.



Stiffness using HarmoniX mode: combination of temperature cycling with HarmoniX mode enables immediate analysis of stiffness map during in-glass transition region of PS in PS-PMMA blend.



Solutions for a nanoscale world.™

Dimension AFM Heater and Cooler Accessories

The Dimension Heater-Cooler accessories include three models that enable measurements of material structure and mechanical properties on materials at the nanometer scale. Used in conjunction with the Veeco Hybrid XYZ closed-loop scanner, the new Auto-Z engage and heated tip control, the heater and cooler provide a powerful combination to the Dimension AFM. Heating or cooling of samples is possible in most SPM modes available with the Dimension platform.

HarmoniX™ Nanoscale Material Property Mapping: Thermal cycling of samples provides information on how elasticity, adhesion and dissipation change at varying temperatures.

Magnetic Force Microscopy: Studies of magnetic head and media materials' performance under temperature variation offer new insights into ways to optimize magnetic storage methods.

Piezo Reponse: Piezo response force microscopy induces and detects switching in small sample areas, for visibility into domain transformation processes within individual grains. Temperature cycling for a sample enhances piezoelectric materials analysis.

Electrostatic Force Microscopy: EFM enables measurements of electric field gradient distribution above the sample surface at varying sample temperatures.

Darklift: This is a unique feature that can be used in conjunction with the SCM, TUNA, or SSRM to reduce errors in the data by eliminating laser induced excitation of electron hole-pairs that negatively influence the results of electrical modes. Used in conjunction with heating or cooling of electrical samples adds a highly desirable dimension for failure analysis.

Work in other modes likewise may be achieved by heating or cooling only the sample:

- Tunneling Atomic Force Microscopy (TUNA)
- Scanning Capacitance Microscopy (SCM)
- Torsional Resonance (TR)
- Torsional Resonance Tunneling Atomic Force Microscopy (TR-TUNA)
- Scanning Spreading Resistance Microscopy (SSRM)

Veeco AFMs are covered under more than 100 patents. For a complete and updated list of patents, please visit www.veeco.com/patents

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MODELS AVAILABLE

DMHC35-250: -35°C to 250°C High-temperature Heater/Cooler Package for Dimension SPM. Combines two plug-in modules, one is an element for high-temperature heating to cover room temperature to 250°C and the second plug-in element is for heating and cooling to cover a range of -35°C to 100°C.

DMHC35-100: -35°C to 100°C Heater/Cooler Package for Dimension SPM. A heating and cooling element to cover a range of -35°C to 100°C.

DMHC-A250: 250°C High-temperature Heater Package for Dimension SPM. A high-temperature heating element to cover a range from room temperature to 250°C.

Heating-Cooling kits include Software control, Thermal Applications Controller, Peristaltic Pump (cooling only), Heated TappingMode Probe Holder, High-temperature Heating Element (DMHC35-250 & DMHC-A250 only), Heating & Cooling element base (DMHC35-250 & DMHC35-100 only), Fluid and Gas Manifold, Cantilever Stand and Accessories.

COMPATIBILITY

The Heating-Cooling kits require a Dimension 3100 Microscope, the Hybrid closed-loop head and NanoScope® V controller, and NanoScope version 7.30 or greater software.

Contact Veeco for a complete list of all modes available with the heater and cooler accessories.

SPECIFICATIONS

	DMHC35-250	DMHC35-100	DMHC-A250
Temperature Range	-35°C ¹ to 250°C	-35°C ¹ to 100°C	RT to 250°C
Noise: Z-Sensor (typ)	0.7 Å to 1.5 Å		0.6 Å to 1.2 Å
Cooling Rate	18°C/min		—
Heating Rate	25°C/min		
Temperature Resolution	0.1°C		
Inert Gas Purging	Yes		
Water Cooling	Yes		—

[1] Achieved by placing fluid pump damper in ice, minimum sustainable temperature depends on sample and setup.



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Find out more at www.veeco.com or call 1.800.873.9750