

Optical Cryo & High Temperature Stage for Microscope

-190 to 1200 °C



2022 V1

For customized projects please Contact us:

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The temperature control stage is scientific research equipment used in professional fields such as materials, geology, food, and medicine. It can be combined with optical microscopes, Raman microscopes, fluorescence microscopes, and other instruments to achieve rapid sample heating or Cooling, while observing the structural and morphological changes of the sample during the process, it helps to understand the physical and chemical properties of the sample.



Gas-tight

Optical temperature control stage

Protective gas can be passed through



Vacuum

Optical temperature control stage

Mechanical pumps up to 10^{-3} mbar

Molecular pump up to 10^{-5} mbar

Features

- Temperature control accuracy: ± 0.1 °C
- Supports transmissive/reflective mode
- Compact structure, suitable for various variable temperature tests
- Wide temperature range: $-190\sim 600^{\circ}\text{C}$ / Room Temperature ~ 1200
- Gas-tight chamber design, can flow protective gas
- Upgradeable vacuum chamber design, 10^{-5} mbar
- The optical windows can be replaced for different materials
- Can be replaced with different types of optical interfaces, fiber optic connectors
- PC software control supports modification or customization

Specifications

Optical Indicators	Cryo 600-190	HT1200
Temperature Control		
Cooling & Heating	Liquid nitrogen cooling/resistance heating	Resistance heating
Temperature Control Range*	-190 ~ 600°C	RT ~ 1200°C
Temperature Stability*	±0.1°C (< 600°C), ±1°C (> 600°C)	
Temperature Resolution	0.1 °C	
Temperature Control Speed	0~50°C/ min (can be fixed point / program segment temperature control)	
Temperature Control Method	PID	
Temperature Sensor	PT100	Thermocouple
Optical Properties		
Optical Path*	Reflected optical path (can be upgraded to the transmitted optical path)	
Window Material*	Quartz glass	
Window Size*	Φ25mm	
Lens Working Distance*	6mm	
Light-transmitting Hole*	No light-transmitting hole by default (can be upgradable light-transmitting hole)	
Window Defrosting	Air blowing defrost at negative temperature	/
Structural Properties		
Sample Table Size*	23×23mm	
Sample Carrier Material*	Silver	Ceramic
Dimensions*	100×100×25mm	
Sample Cavity Height*	4mm	
Chamber*	Gas-tight (can be upgradable to vacuum)	
Shell Cooling	Recycled water	
Remark	Above are all default parameters, with * being customizable.	

Temperature Range Choice

Low Temperature Stage: -190~600°C

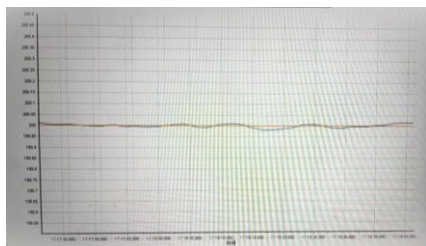
Low temperature optional -190°C -180°C -160°C -120°C -100°C RT

High temperature optional 400°C 600°C

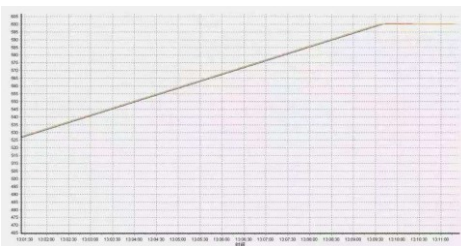
High Temperature Stage: RT~1200 °C

High Temperature Optional RT~ 400°C 600°C 800°C 1200°C

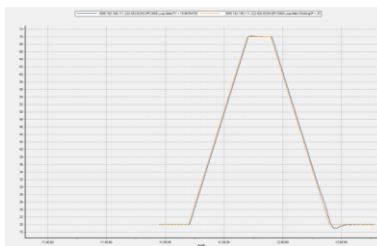
Temperature Control Accuracy



Temperature Stability



Fixed Slope Heating



Programmable Block Ramp Up & Down

Temperature control stability maximum ±0.1 °C

Heating and cooling speed (control) 0 - 30 °C/min (recommended), maximum 60 °C/min

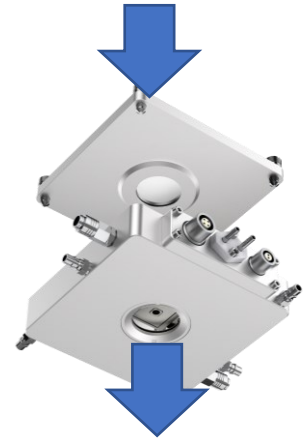
Light Transmission Mode



Reflection Mode



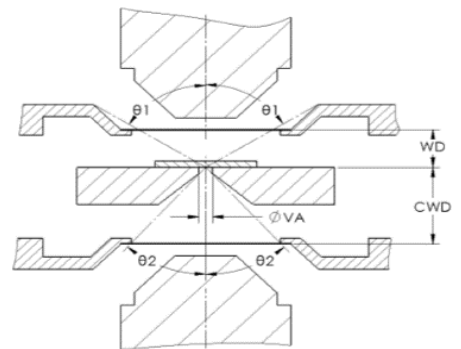
Stage



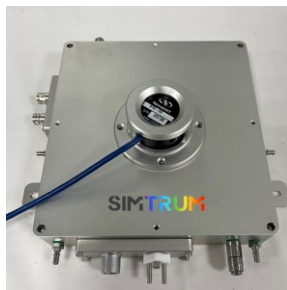
Transmission Mode

Light-transmitting Window Material

- 1) Sample stage material: silver (medium and low temperature), ceramic (high temperature)
- 2) Sample stage size: 23x23mm (can be customized)
- 3) Light transmission hole: 2mm (can be customized)
- 4) Window material: optical glass, sapphire, calcium fluoride etc.
- 5) Window size: ϕ 25mm (can be customized)



Customized Optical Interface



Sample / Window Defrosting

Sample Defrosting Method

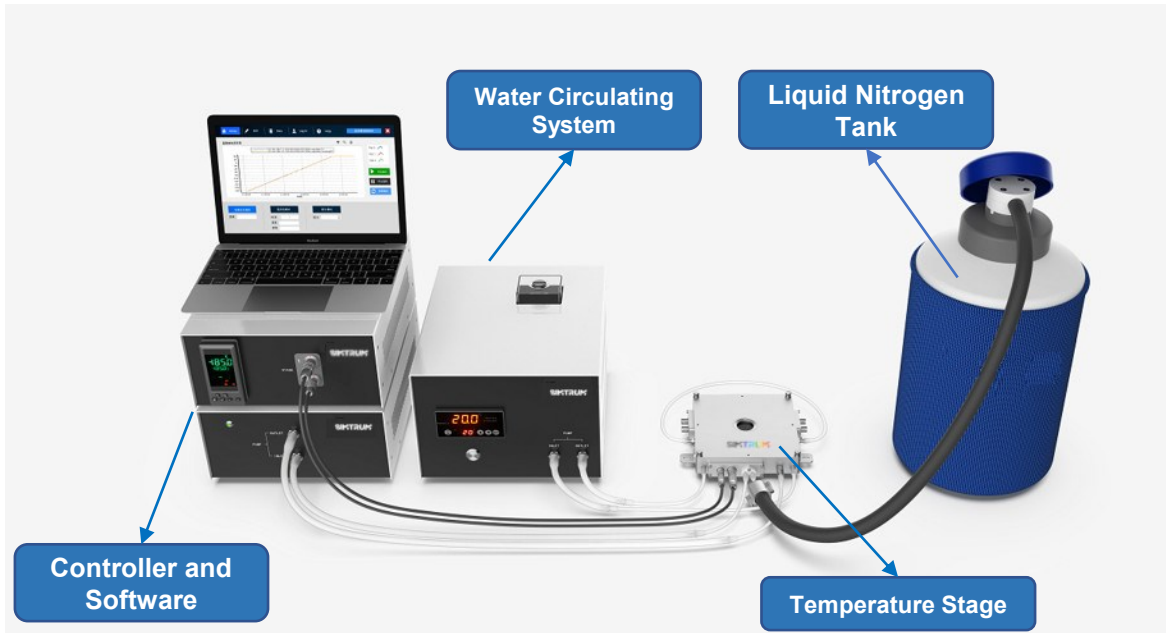
- a. Flow protective gas, b. Vacuum

Window Defrosting

Nitrogen purges the window glass.



Temperature Control System



Liquid Nitrogen Consumption

- 1) The maximum liquid nitrogen consumption is 1L/h, maintained at -190 °C ;
- 2) Normal use 0.5L/h, high and low temperature changes.

Water Cooling System



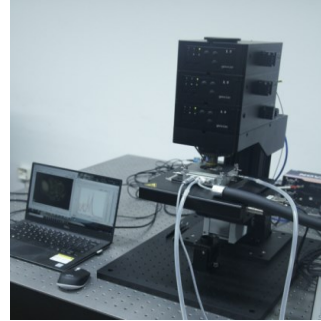
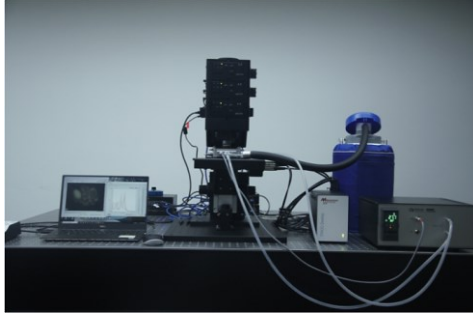
Water circulating system
(temperature control)

The water circulation system is needed for Ultra-low or High-temperature environments. It attaches to the Temperature stage chamber

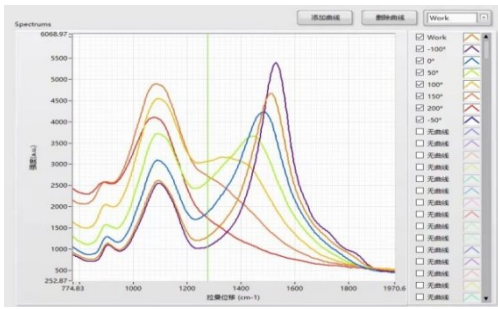
- For low temperatures application down to -190 degrees it will prevent water condensation to the stage and chamber
- For high-Temperature application it will cool the chamber wall to room temperature for safety

Applications

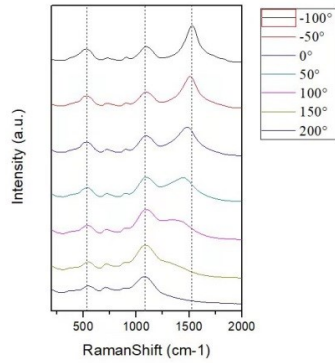
Confocal Raman for Thermal & Cold Characterization of Two-dimensional Materials



Real System setup



Raman Shift Result

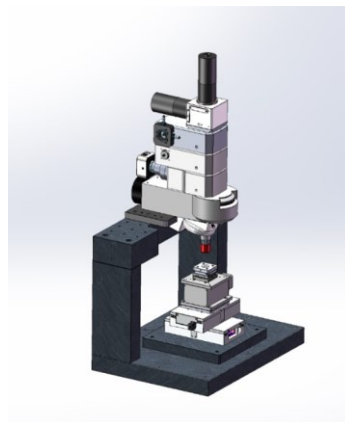


Temperature Chart

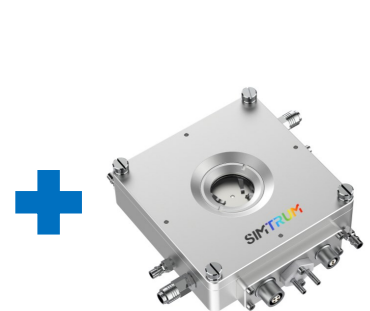
System Configuration Customized Option Available



Raman Spectrometer



Confocal Microscope



Temperature Stage

Applications



Large NA High Sensitivity Spectrometer

Materials Light Absorption Analysis at Different Temperatures



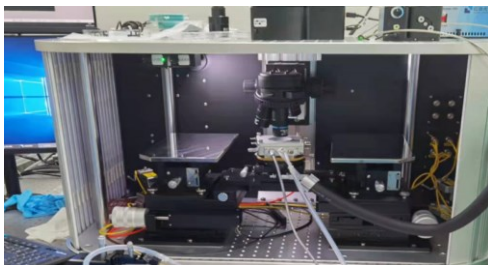
Infrared Transmission Spectrometer with Hot and Cold Stretching



OLED Material Temperature Change Test



Temperature Change Test of Semiconductor Material



Material Spectrum Temperature Change Test



Microscope Temperature Change Test