LOW TEMPERATURE REACTION CHAMBER FOR THE PRAYING MANTIS



Diffuse reflection spectroscopy is a very sensitive method for detecting changes at the surfaces of rough materials. It is particularly effective for powders that have high surface areas. This makes diffuse reflectance invaluable for studies of heterogeneous catalysis, gas-solid interactions, photochemical reactions, and oxidation mechanisms. This Low Temperature Reaction Chamber is well suited for performing such studies under carefully variable temperatures and pressures.

Applications

» Allows diffuse reflection measurements under a wide range of controlled temperatures and pressures.
» Used in conjunction with the Praying Mantis diffuse reflection accessory.

Features

» Designed for studies from high vacuum (133 µPa or 10^{-6} torr) to 133 kPa (1 ktorr) and at temperatures from -150°C to 600°C (under vacuum).
» Three inlet/outlet ports provided for evacuating the cell and introducing gases.
» Made of chemically resistant 316 stainless steel.

Includes

» Reaction Chamber.
» Low-voltage heating cartridge.
» K-type thermocouple.
» Sample packing tool and spill tray.
» Dome with two KBr windows and one glass observation window (FTIR configuration)
» Dome with two SiO_2 windows and one glass observation window (UV-Vis-NIR configuration).

Ordering Information

ITEM	CATALOG NO.
Accessory	
Low Temperature Reaction Chamber, 24V (FTIR configuration)	CHC-CHA-5
Low Temperature Reaction Chamber, 24V (UV-Vis-NIR configuration)	CHC-VUV-5
Windows for Vacuum Chambers	
SiO_2	WAD-U23
Si	WED-U23
CaF_2	WFD-U23
ZnS	WID-U23
ZnSe	WMD-U23
KBr	WPD-U23
Options & Replacement Parts	
Screen Set, two each of three mesh sizes	116-439
K-Type Thermocouple	008-144
FKM O-Ring Set	CHC-ORV
FFKM O-Ring Set	CHC-ORK
Heater Assembly	CHC-HTR
Heater, 24V	HTRS-16
Temperature Controller, 24V output, with USB adapter, 110V	ATK-024-5
Temperature Controller, 24V output, with USB adapter, 220/240V (CE marked)	ATK-024-6

LOW TEMPERATURE REACTION CHAMBER FOR THE PRAYING MANTIS

Harrick Scientific offers a Low Temperature Reaction Chamber for use with the Praying Mantis Diffuse Reflection Accessory for analysis of powders and other rough-surfaced materials in a controlled environment at controlled temperatures and pressures.

This reaction chamber is made from chemically resistant 316 stainless steel and incorporates a sample cup within a temperature-controlled sample stage. This stage incorporates a cartridge heater and K-type thermocouple. The stage is thermally isolated from the outer chamber. A water-cooling jacket is provided to control the temperature of the outer chamber and windows during high and/or low temperature operation. The reaction chamber also features three gas ports for evacuating or flowing gas through the sample. These ports have ¼" VCO fittings with FKM o-rings. One of these ports leads directly under the sample cup; the other two lead into the sides of the chamber.

Optically, the Low Temperature Reaction Chamber is designed to maximize light interaction with the sample while minimizing reflection losses from the windows. The radiation enters and exits the chamber perpendicular to the two optical apertures. A third aperture is provided for viewing, illuminating or irradiating the sample. This reaction chamber includes two KBr windows and a glass observation window for the FTIR or two SiO_2 windows and a glass observation window for the UV-Vis-NIR. These windows are mounted in a removable stainless steel dome using o-ring seals. This reaction chamber can be operated from high vacuum to two or three atmospheres with the KBr or SiO_2 and glass windows provided. Other window materials are available for different wavelength regions. Low refractive index window materials should be selected to minimize reflection losses.

This Low Temperature Reaction Chamber is designed for operation from -150°C to 600°C (under vacuum) and from high vacuum (133 µPa or 10^{-6} torr) to 133 kPa (1 ktorr). At higher pressures, the maximum attainable temperature might be lower, due to heat losses that depend upon thermal characteristics of the sample, reactant gas, and gas pressure. In addition to the heater incorporated into the sample stage, the Low Temperature Chamber also features a cooling conduit connected to a dewar. The dewar can be filled with liquid nitrogen or other coolant to cool the sample stage below room temperature. For optimal temperature control, Harrick Scientific recommends our Temperature Controller for stable heating of the system, both above and below room temperature. Heater and thermocouple connectors are compatible with this controller.