Keywords:- Environmental Chamber, Selector, Temperature, Pressure.

Environmental Chamber for Selector™ Accessory P/N GS19930

The Environmental Chamber P/N GS19930 is designed to be used with the optical system of the Selector™ diffuse reflectance accessory P/N GS19900. It extends the sampling capabilities of the Selector™ by allowing the study of a diffusely reflecting sample at temperatures up to 800°C and pressures from vacuum to 500psi. Solid or powder samples are placed onto a sampling cup within an atmospherically controllable chamber.

The standard chamber window is ZnSe which offers a good balance between wide Mid IR transmission and mechanical strength. Other windows are available on request. The main body of the unit is constructed from 316 stainless steel for durability and chemical resistance.

Safety features include low voltage heaters powered by a dedicated temperature controller and an automatic shutdown feature, should the temperature sensor detect an overheating fault. A water cooling jacket keeps the outside of the chamber cool when operating at high temperatures and a safety 'burst disc' activates whenever the pressure exceeds the recommended safety limit.

The maximum achievable sample temperature depends on the pressure and nature of any gases surrounding the sample within the chamber. The volume of the chamber is 38mls. Under vacuum conditions the maximum operating temperature of 800°C is attainable, but using a nitrogen atmosphere at the full working pressure of 500psi, the temperature maximum is reduced to approximately 550°C, due to the relatively high thermal conductivity of this gas at high pressure. Other gases, notably helium and hydrogen, have a much higher thermal conductivity resulting in further reduction of the maximum working temperature at maximum pressure.

It is normal for the Selector™ diffuse reflectance accessory, when used to sample finely ground KBr powder on its own sampling baseplate, to give a signal throughput of about 5% of an open beam signal. The signal drops to between 1.5% and 1% when the Selector™ is used on the Environmental Chamber with the same finely ground KBr powder in the sampling cup. Therefore, a sensitive detector such as a liquid nitrogen cooled MCT detector may be required when using the Environmental Chamber for diffuse reflectance experimentation.

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