



# RHK Technology Brief

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## RHK Variable Temperature Sample Holder with Built-In Quartz Lamp Heater

Zhouhang Wang

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## Introduction

RHK's new quartz lamp sample holder is a powerful addition to the RHK family of variable temperature sample holders.

A large field of research studies the interaction of reactive gas species with various surfaces. These experiments must be performed, however, with several precautions. Nude ion gauges must be turned off for fear that the hot filament could damage or the reactive gases might ionize and decompose, calling the entire experiment into question.

Similar precautions for heating samples preclude the use of a bare filament as a radiative heater. RHK's UHV 700 and 750 subsystems offer a special solution to these constraints. Their built-in quartz lamp sample holders free researchers to safely tackle the real science of high pressure SPM.

Aside from allowing radiative heating in a reactive atmosphere, the new design confers other advantages. The first of these is in the proximity of the heater. RHK's quartz lamp sample holder has its fixed quartz lamp heater built in directly below the sample (**Figure 1**). Compared with a similar heater on the sample stage, this quartz lamp is significantly more effective, being situated much closer to the sample itself.

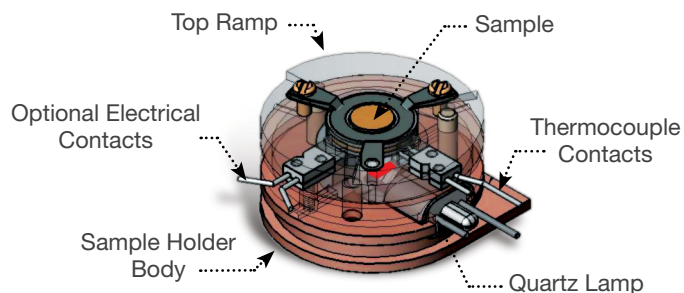
Another advantage is the inherent mobility of the sample holder. Not only can the sample holder be used effectively in an SPM chamber, it is also useful in preparation or analysis chambers that would otherwise permit only costlier and far less flexible heating methods.

As yet a further advantage of an on-board sample holder heater, maintenance routines such as changing bulbs can be done without breaking vacuum. This is necessary in the event of a bulb burnout, but it is also helpful in the case of swapping heaters. For instance, during

an on-going experiment, a researcher might decide to replace the quartz lamp sample holder module with an RHK tungsten filament module when changing the sample. These operations are now possible with minimal effort and without venting the system.

## Technical Configuration

The quartz lamp has a 20 W power capacity, which is sufficient for heating a 1.5 mm thick, 10 mm diameter copper disc to over 400°C. The test sample was thermally isolated from the sample holder with two sapphire washers. There is a K-type thermocouple in contact with the sample for direct and accurate measurement of sample temperature. Additional electrical contacts are also available for unique experimental requirements.



**Figure 1:** The RHK quartz lamp sample holder showing all 4 possible electrical contacts.