

# **Home Built Variable Temperature based Infra Red Spectroscopy Attachment**

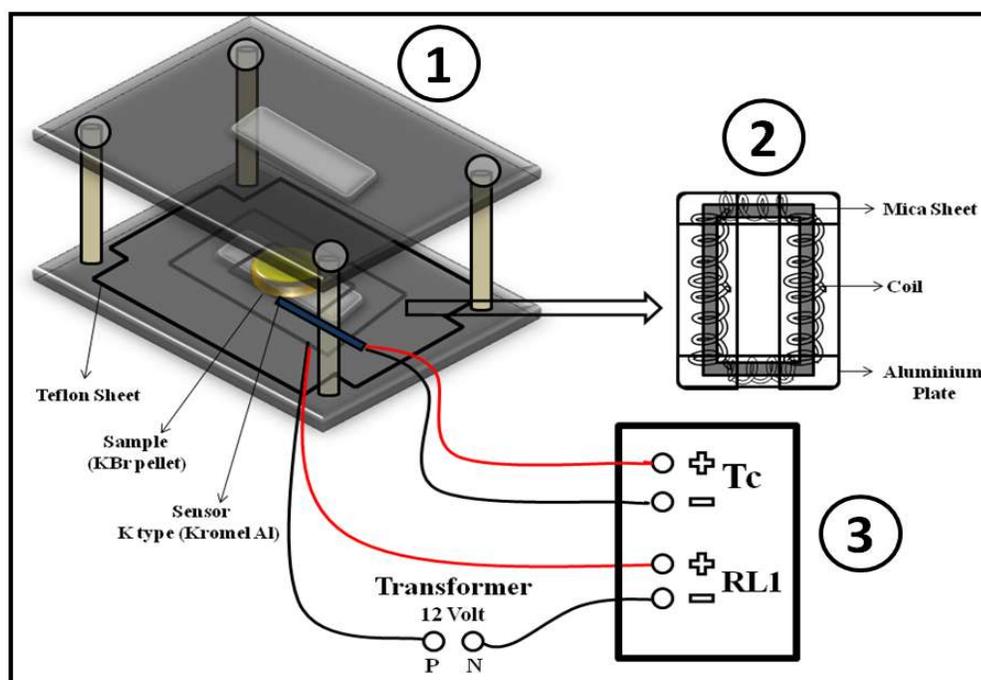
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## **Annexure-I**

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Fourier-transform Infrared spectroscopy (FT-IR) is an important tool and widely used technique for the identification of organic and inorganic materials. In FT-IR, the vibronic resonances are used to determine the structure and coherent dynamics of molecules. Absorption in the infrared region is due to the change in the vibrational and rotational levels. At different ambient temperature (sample temperature) the absorption will change. To vary the sample temperature we have made an attachment for measure the FTIR spectra at the temperature range from room temperature to 200 °C. Figure 1 shows the schematic of the attachment which has only three part viz. sample holder, heater and PID based temperature controller.



**Fig. I.1:** The schematic of the FTIR attachment which has three parts namely: 1-Sample holder, 2-Heater and 3-PID based temperature controller

As shown in the Figure I.1, the first part is a sample holder which consists of a Teflon sheet between the two metal sheets for holding the heater at a specific place. Also, it provides thermal insulation to the sample holder at higher temperature. At the edge of the Teflon sheet, a notch is made to hold the thermocouple which is directly in contact with the sample to measure the actual temperature of the sample. The second part is a 20 W

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Heater. The Heater is design in such a way that the centre part is open for the transmission of the IR spectra through the sample as well as the sample holder. The actual Heater assemble in the sample holder is shown in Figure I.2.

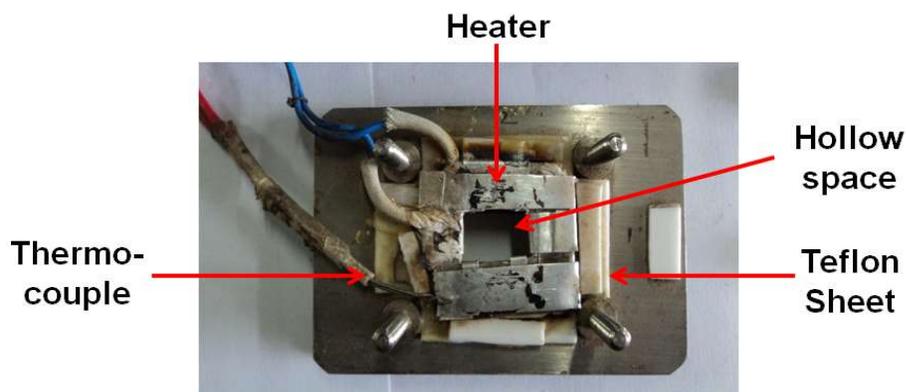


Fig.I.2: Actual setup heater assemble fitted inside the FTIR sample holder

The heating cycle controlled by the third part of the attachment i.e. temperature controller. The temperature controller is a standard PID Zone controller from SELEC (Model TC 303). The whole assembly is shown in Figure I.3 contain temperature controller and the FTIR attachment with heater inside.

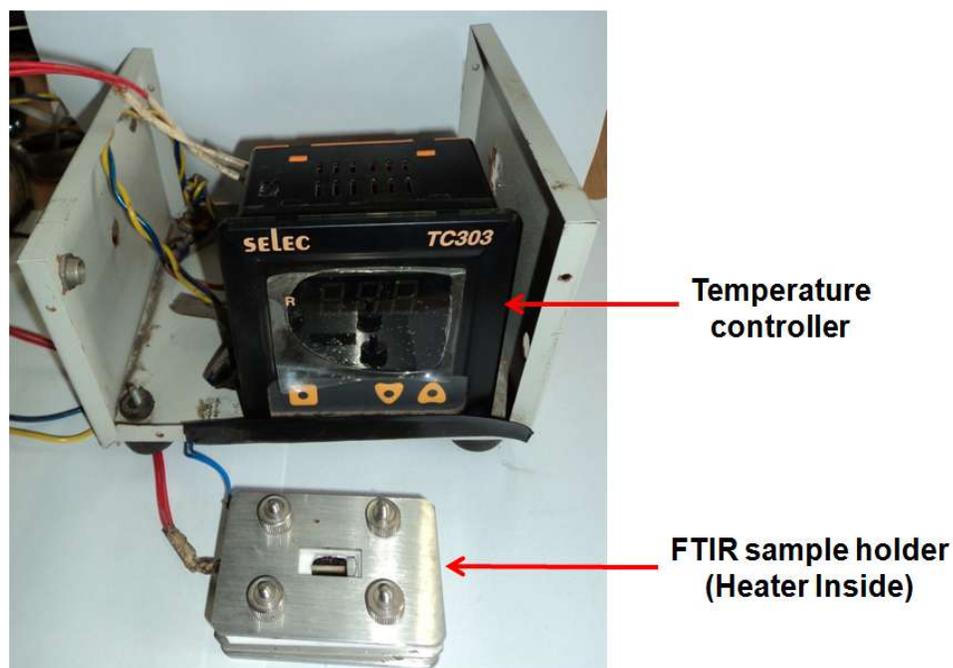


Fig.I.3: Whole set up for Temperature controlled FTIR spectra sample holder