(B)

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The Heat Cell

A cell was needed to modify the ellipsometer such that ~~we will be able to~~ change the temperature of the sample in a well controlled atmosphere. A description of the design follows.

Body of Cell: This was made of brass, side and top views of it are shown in Figures 1 and 2. There are three windows on the cell to allow for the two angles of incidence that are available on the ellipsometer. One arrangement allows for an angle of incidence of 67.5° and a second arrangement allows for a 45° angle of incidence. The top view shows the two arrangements. The windows are 1" windows mounted on flanges that are attached to the body of the cell through formed steel bellows. This allows for the tilt of the windows such that the beam of light is normal to the quartz windows at entrance and at exit. All windows are mounted on Viton and O-Rings to seal the cell from the outside atmosphere.

The Heater: (Figure 3) The temperature of the sample is controlled by mounting it on a copper mount that is heated by a conventional (100 watts) heat cartridge impeded inside it. The temperature is controlled by a heat controller. By mounting the thermocouple on the reflecting surface of the sample we are able to measure the temperature very accurately. Figure 4 shows the special clamps that were machined to mount the sample and the thermocouple. A maximum temperature of 400°C was obtained by this arrangement. The heat cartridge is mounted on the top of the cell where we have two parts to allow for circulation of the desired gas.

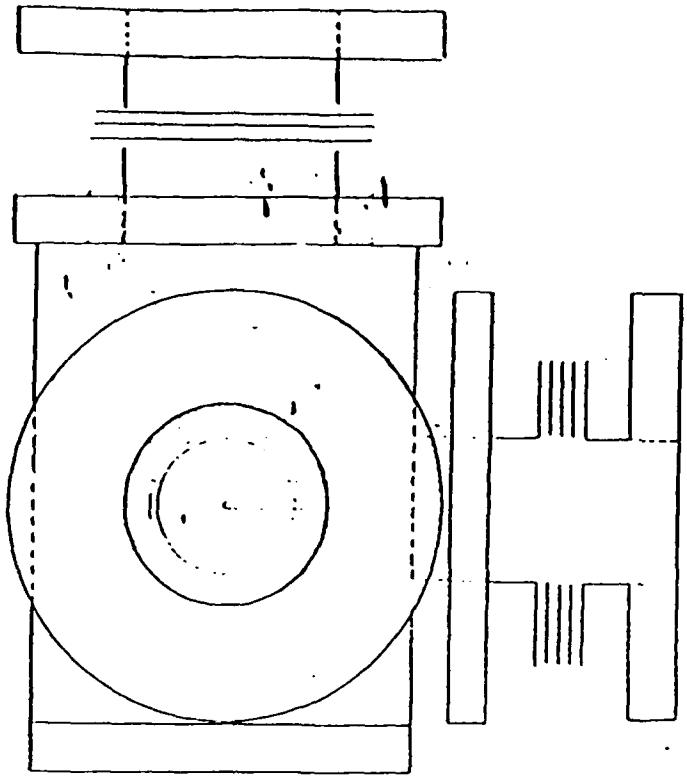


FIGURE 1: Side view of cell showing 2 windows only. Top Flange is used to mount heater and provided with bellows to tilt sample inside cell.

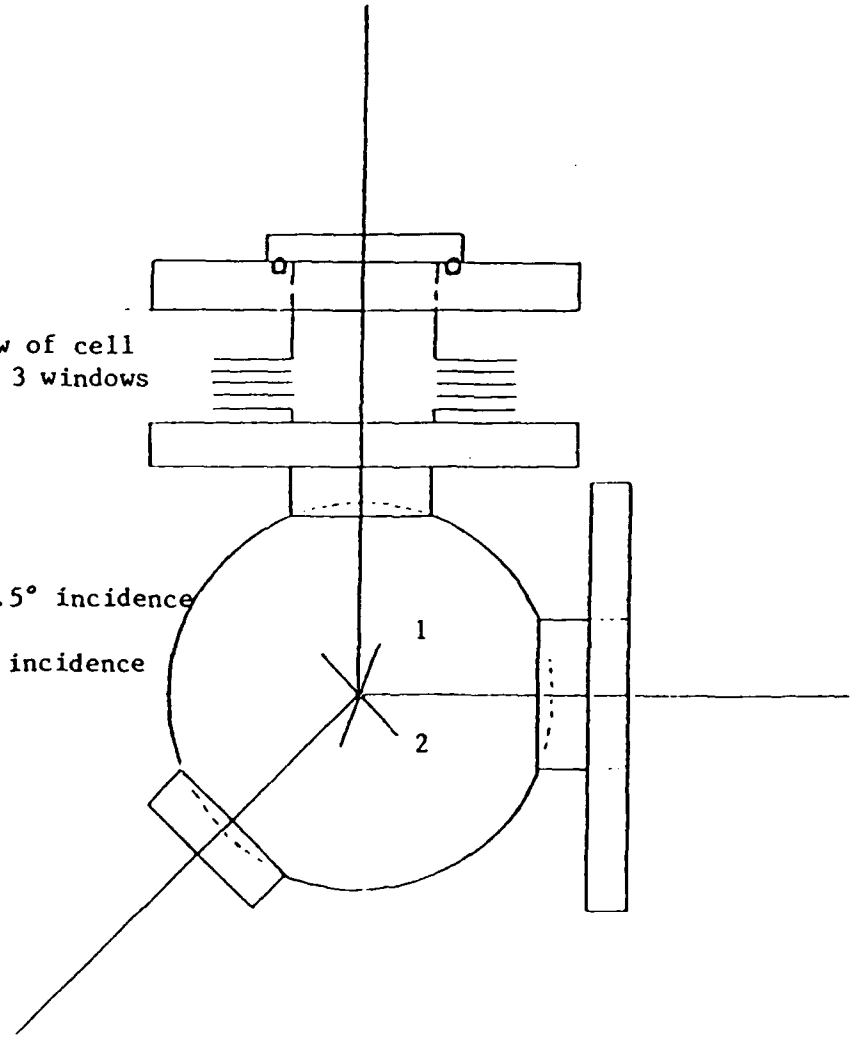


FIGURE 2: Top view of cell showing 3 windows

1 is sample in 67.5° incidence

2 is sample in 45° incidence

1,2	Gas inlets
3	Alumina rod for heat insulation
4	Copper mount
5	Sample clamps
6	Sample
7	Thermocouple
8	Heater cartridge
9	Thermocouple wires
10	Heater wires

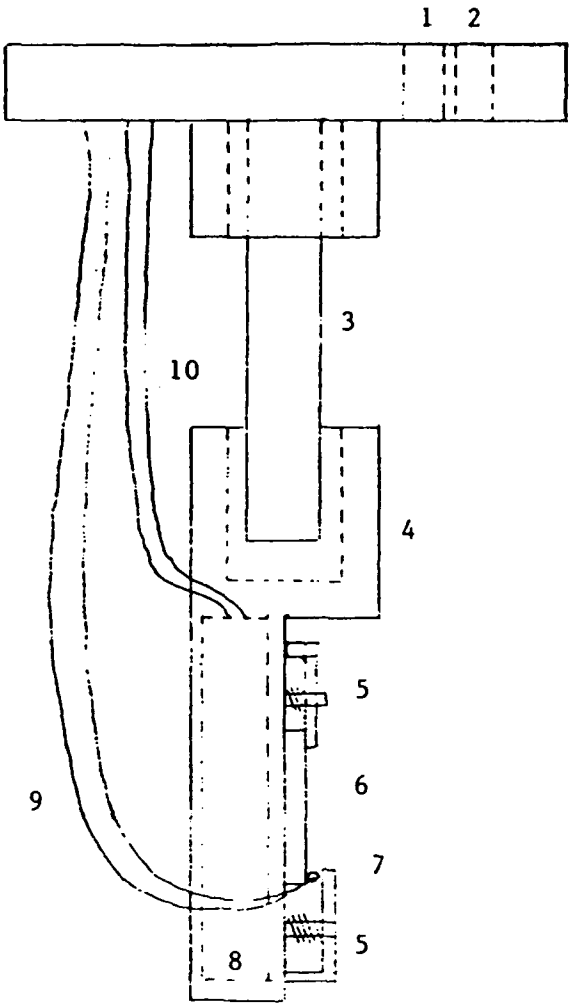
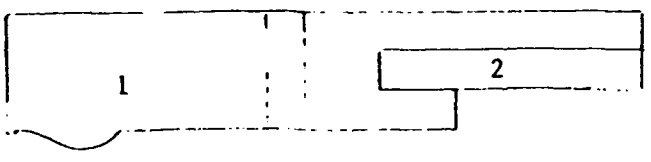


FIGURE 3



1 Sample body made from Aluminum
2 Teflon insert to protect sample