

III. SOLID STATE PHYSICS

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A. SOFT X-RAY SPECTROSCOPY

We have obtained the nickel M_{23} emission band. The curve is similar to the copper band, except that the d-band is only partly filled and somewhat wider than that of copper. The nickel was evaporated by using a graphite crucible, and consequently, the effect of possible carbon contamination must be checked with an aluminum oxide crucible. This study will be carried out when the crucibles are available.

The possibility of carbon contamination caused by the diffusion pump oil has been considered. First, the voltage dependence of the carbon K-emission edge was determined. A target coated with a colloidal solution of graphite and alcohol was the source of the carbon emission line. With a copper target no carbon contamination was observed when the liquid air trap was in use.

Work on the iron emission curve has been started.

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B. MICROWAVE STUDY OF SEMICONDUCTORS

1. Electrical Properties of Germanium at Microwave Frequencies

A new cavity has been designed with which the measurements of the dielectric coefficient and conductivity are being made. Data are being taken on approximately 25 samples of various impurity and size.

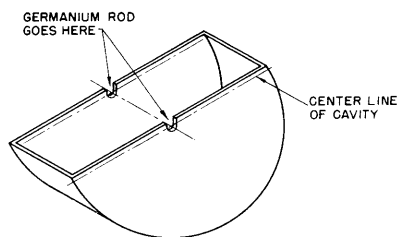


Fig. III-1

Cavity for mounting germanium center post.

The new cavity is a standard cylindrical cavity cut through the ends slightly off the axis. (See Fig. III-1.) Samples are soldered in it after they have been ground, degreased, washed in boiling water, and plated on the ends. The soldering is done in an oven so as to insure uniform heating. Unless this is done, there is a high probability of sample fracture due to the differences in thermal expansion of brass, solder, and germanium.

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