

DEPOSITION of the NIOBIUM LOOP LAYER on DEVELOPMENT QUARTZ HOUSINGS

This procedure covers the deposition and inspection of the niobium coating for pickup loop fabrication on Development Quartz Housings. The primary emphasis is upon the inspection results. Details of the equipment operation can be found in the Microscience Sputter System Operating Procedures, dkg00522.doc.

A pre-clean in hot sulphuric acid per Procedure P0062 shall be preformed unless parts were previously so cleaned.

Clean per GP-B S#0025 steps I-IX. with the Interlab Rotor Cleaning bench.

Immediately upon removal from the hot air drier the housing shall be masked with the shadow mask set consisting of the following:

LOOP DEPOSITION MASK	dualout1.dwg
LOOP DEPOSITION FIXTURING,MASK HOLDER	Microscience
SAMPLE LOCATOR,PICKUP LOOP DEPOSITION	smploc.dwg
LOOP MASK ALIGNMENT TOOL	alignpin.dwg
CAVITY MASK	cavmask.dwg-5
SPINDLE,CAVITY MASK	spindle,mask
CAVITY PLUG	plug.dwg

These have a pattern O.D.(excluding bonding pad and detachable lead key) of 1.660" and an I.D. of 1.5338"

After cleaning the housing shall be immediately masked and installed in the Microscience system along with 5 each 1/4" samples for co-deposition which were cleaned per GP-B S#0025 steps I-IX. with the Interlab Rotor Cleaning bench

Allow the loadlock to pump down to a pressure of less than 5.0×10^{-6} Torr before transferring into the main chamber.

The base pressure shall be less than 1.5×10^{-7} Torr and this value recorded on the deposition record sheet.

The pump shall be throttled and the pressure 1 minute after throttling shall be less than 2.0×10^{-7} Torr and this value recorded on the depositon record sheet.

Verify the crystal monitor programing for the required film thickness specified on the deposition request form and the operating parameters currently recorded in the system operating manual.

Record the deposition conditions on the depositon record sheet, including pressure, argon flow, target current, target voltage and indicated rate in the following unit respectively, micron, sccm, amps, volts and the indicated rate in nm/sec.

Follow instructions on the deposition request form as to which inspections and tests to perform. If required perform as follows: Inspect the deposited film at 40 x in transmitted light and record on the housing inspection form any defects noted. Adhesion test with Scotch@ Tape and examine both the tape and coating for adhesion failures, note results on the housing inspection form.

Make measurements on the 5 each 1/4" samples which were co-deposited to determine layer thickness and transition temperatures.

Recorded the measured film thicknesses. They shall be as follows:

Niobium layer nm thick, per deposition request form
Uniformity < 10 % P-V

Recorded the measured transition temperature and resistance ratio. They shall be as follows:

Tc min. 8.00 max. 17.00
R/R min. 2.50 max. 500