Vacuum Deposition Chamber

Edward J. Sanville and Parul Dhagat

I. Belljar, Fixtures and Feedthroughs

All of the fixtures and feedthroughs were disassembled. The metal parts were cleaned of residue and grease, and the O-rings were regreased using silicone high-vacuum grease. The baseplate was thoroughly cleaned and wiped down, and the system was reassembled. Much of the soot was removed from the inside of the belljar using ethanol and scotch-brite. The gears and pulleys used to raise and lower the belljar were oiled with WD-40 to prevent the horrendous high-pitched sound of metal on metal.

II. Substrate Holder Design

A simple design for a machineable substrate holder has been drafted utilizing the four existing 3/8-16 tapped holes in the baseplate. Essentially, the design is comprised of four aluminum poles which support a large circular plate. The circular plate has a square hole in the center, which is surrounded by four tapped holes for screws which will be used to affix the substrate plate into the hole. The circular plate also serves to block the line-of-sight deposition of material onto the top inside surface of the belljar, which is only accessible to very tall people for cleaning.

III. Crystal Monitors

IV. Photographs

Fig. 1 – Feedthroughs and fixtures before disassembly.

Fig. 2 – Source holder and electrodes before disassembly.

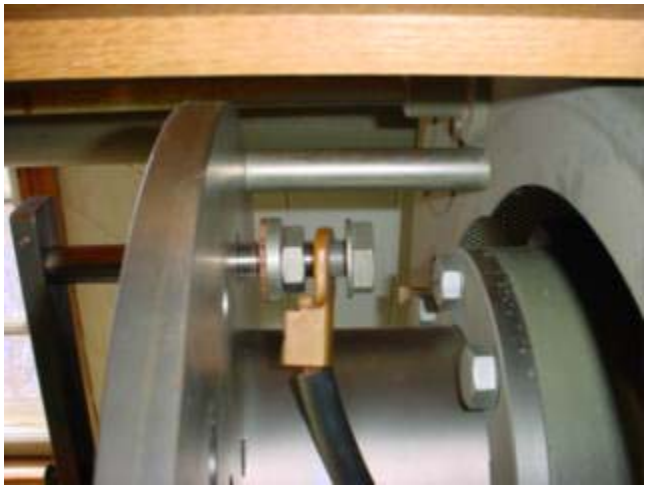
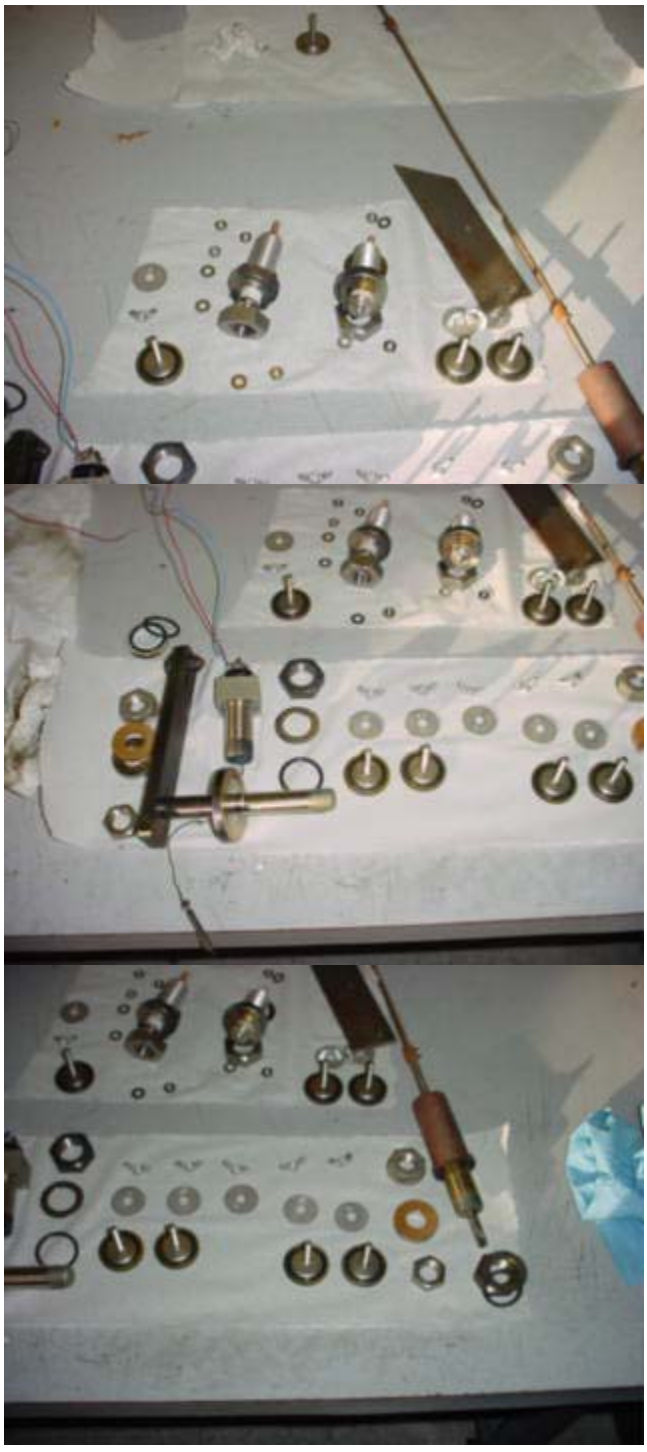


Fig. 3 – High voltage contact with electrode feedthrough showing location of washers, nuts, and bolts (picture found useful for reassembly).

Fig. 4 – Top of electrode feedthrough.



Figs. 5a, 5b, 5c – The many nuts, bolts, washers, and O-rings comprising the full set of fixtures and feedthroughs. All metal surfaces were cleaned of residues and dirt. All O-rings were resealed using high-vacuum silicone grease.