solution, 90 g of $FeNO_3$ in 100 cm^3 of distilled water, at 45°C, accomplished photo-etching in a few minutes while the solution was stirred constantly to remove gas bubbles from the reacting surface. After washing the cut specimen in distilled water, the photo-resist coating was dissolved with acetone.

Foil thickness was then measured mechanically using gage blocks and an electronic, dial depth gage. Typically a total of five measurements were made at various spots on the foil; thickness variation was ± 4%. Average thickness measured in this way agreed within 3% with the thickness calculated from measured resistance of the foil and handbook values for the silver resistivity. A repeat of several thickness measurements reproduced the average thickness within 2% or better.

Cut foils were examined and photographed under a microscope. Faint scratches from the polishing were usually visible at 100X magnification. Spots of tarnish and some areas where ridges due to rolling were still visible were noted; occasionally spots about 25 μm in diameter were visible where apparently a dust speck had allowed the photo-etch solution to start eroding the foil body. But overall, the foil surfaces were smooth and relatively stain-free.

Annealing of cut foils was accomplished at 800 ± 15°K for one to two hours in a vacuum better than 10^{-5} torr. Cooling took place at less than 100°K per hour. The anneal gives specimens a known thermal history and increases the crystal lattice perfection.

A measure of crystal perfection is specimen resistance at 4.2°K; at liquid helium temperature lattice vibrations are of such low amplitude that electron scattering is predominantly due to lattice imperfections, impurity atoms, and foil surfaces. Surfaces come into play since electron mean free path in silver at 4.2°K is a substantial fraction of foil thickness. Hence, a correction is necessary to get bulk resistance (Sec. II.E). Resistance across specimen potential leads was measured at room temperature, liquid nitrogen temperature, and at liquid helium temperature using 2 amperes of current and measuring the potential drop with a Keithley 148 Nanovoltmeter. Foil leads were clamped between copper blocks. Current reversal was used to nullify any thermal emf's. A total of four readings were taken at each temperature.

As mentioned previously, the W3N silver specimen purity, as measured by residual resistance, was higher than the MRC silver purity. Spectrographic analyses of foils which had been through the preparation sequence were consistent with this result. The spectrographic analyses also indicated that foil surfaces were probably contaminated by Al_2O_3 particles acquired during the polishing sequence.

Before assembling the silver-sapphire sandwich each foil was weighed, and foil width and distance between potential leads were measured. Weighing provides a very rough density check, providing a relative quality check among the foils used. Finally, short 28 gage silver wire leads were spot welded to the ends of the foil leads for ease of handling during assembly.