clean graphite mold (see Figure 1), and single crystals were grown ten at a time by means of an evacuated gradient furnace.[31] The bottom of the mold containing the crystals was then sawed off square, by means of a mitre box, and ground on successively finer grades of silicon carbide paper placed on plate glass. In grinding, care was taken to draw the crystals only over unused portions of the paper to avoid contamination of the surface. The final grinding was on #600 grit silicon carbide paper using Methyl alcohol as a lubricant to minimize the depth of amorphous layer that results from such a grinding operation.[32] The freshly-ground surface was rinsed in alcohol and the mold placed in a drying oven at 110°C for six to twenty-four hours.

In order to remove the amorphous film which resulted from the grinding operation, along with any other surface contamination that might inhibit diffusion, the samples were ion bombarded immediately prior to plating. An apparatus, as shown in Figure 1, was constructed, which made it possible to ion bombard and plate samples without removing them from the vacuum system. It was found that the ion bombarding procedure would dislodge material from any exposed metal surface in the region of the ion discharge and that some of this material would be plated onto the lead surfaces. In order to minimize this problem, glass was used wherever possible within the bell jar.

It is to be noted that during the entire operation, the lead crystals were contained in the same mold in which they were grown. The reason for this is threefold. First, the fact that carbon has a lower conductivity