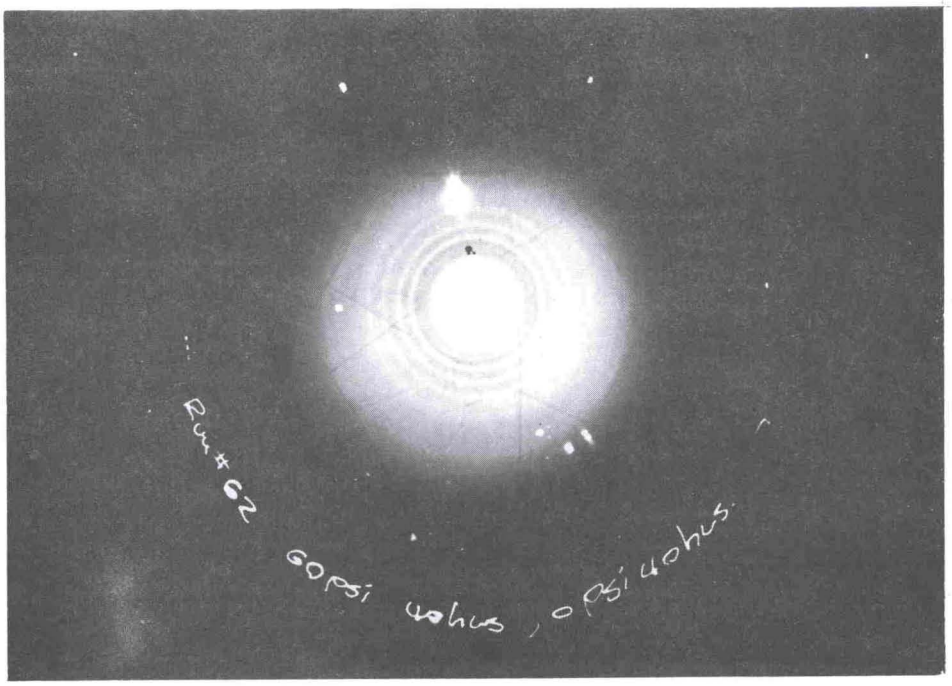

Figure 29 X-RAY PATTERN OF RbCl at 1 BAR AND 25 KILOBARS

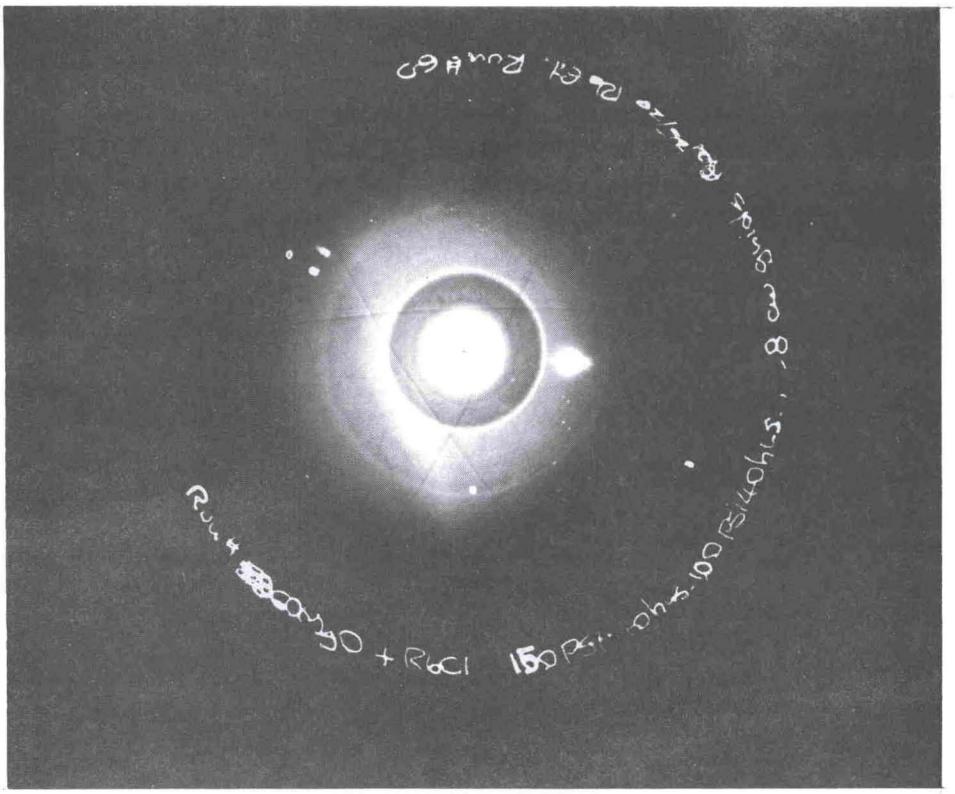

Figure 30 X-RAY PATTERN OF RbCl AT 40 AND 60 KILOBARS

retaining plate flush against the piston face. After run 133, this diamond was removed and inspected for alignment of the core axis with the pressing direction in hopes that it might be substituted for the anvil diamond. However, the alignment was not good and it was replaced in position on the piston.

The punch diamond, being supported over the whole area of its surface by the piston face except for the beam hole, is subjected to much less severe stresses than the anvil diamond which is supported only on its conical surface More failures have been observed in this diamond.

The first anvil diamond was used without change for 71 runs. Upon raising the pressure for run 72, a noise was heard in the cell. Upon inspection, it was found that the anvil diamond had not been mounted in the plate itself, but had been mounted in an approximately 0.0250-inch-diameter steel insert which had slipped about 1 mm under load. The plate was pressed out and the plate containing a spare mounted diamond was pressed in. On the first application of pressure this diamond cracked. The original unbroken diamond was sent back to be remounted in a new plate. This, after remounting, broke after three runs. The third diamond was removed after five runs because of low table clearance. That is, the height of the table above the mounting plate was insufficient to prevent extruded sample material from assuming part of the load. After remounting in a new plate, this diamond broke on the first application of load. The fourth diamond was used for 14 runs. However, it may have been broken after about 11 of these, judging from the appearance of the films. The fifth diamond was found broken in its mounting plate before use.

The next diamond was used for 19 runs without failure. However, experiments in other laboratories had indicated that brilliant cut gem diamonds, which are actually less expensive than those ground to the conical shape of the original design, were suitable. In the use of brilliant-cut stones, the culet is used as the loading surface. For this application, the culet is made somewhat larger than is normal for a gem. The diamond is supported on its table face. Since the sample is raised above the apex of the 45-degree cone machined in the anvil insert plate, a slot was machined in that plate to allow observation of the diffracted X-ray out to the full angle $2\theta = 45$ degrees originally available. A brilliant-cut diamond in this configuration was used for 20 runs. However, the small size of the culet which was advantageous in achieving high pressure at low load introduced large stress gradients in the volume illuminated by the X-ray beam. The culet diameter was only slightly larger than the X-ray beam itself and the pressure fell nearly to zero within the illuminated volume.

For runs subsequent to No. 133, a brilliant-cut stone has been used mounted in the normal fashion, that is, with the punch diamond bearing on the table of the anvil diamond which in turn is supported by the faces below the girdle. No failures have yet occured with this mounting.