tween improperly aligned diamonds. If an average pressure value is assigned to each terrace of the contour map and multiplied by the area of the terrace, an average pressure of 11.9 kbar is obtained, in good agreement with the applied pressure. A similar determination for Fig.4, representing the same sample at 12 kbar with well aligned diamonds, gives a value of 12.3 kbar.

A similarly shaped pressure contour map was obtained for pure nickel dimethylglyoxime using the photographic method. These photographs are given in Fig.8 with the illumination used and the assigned pressures. It is much more difficult to determine the position of the boundary at higher pressures owing to the broadening and decrease in intensity of the absorption band. This problem could perhaps be reduced by the use of a high-contrast film.

The photographic method has been more adequately applied to the determination of pressure contours for a sample of pure thallium bromide. Some of these photographs are given in Fig.9 and the contour maps derived at different pressures are given in Fig.10. From these studies, it can be seen that with proper alignment of the diamonds, the samples distributed uniformly about the center of the cell. Therefore, data obtained by the simpler microsectioning pattern given in Fig.2 is just as meaningful, and the mathematics of diametric profiles are more conveniently treated.

A parabolic pressure decrease from the center to the edge of the cell, in agreement with the prediction from our optical observations, was found in every experiment. However, several common deviations often occurred; e.g., at low pressures the parabola did not always extend to the edge of the diamonds as shown by the LiF curve in Fig.14. This occurred mostly with the less compressible materials and at low pressures. It is the result of a sharper pressure drop near the edge than expected and is probably due to the orientation of the sample during the high-pressure working procedure, preceding the investigation at the low pressure. It appears that the high-pressure gradient is "frozen in" near the edge of the cell as the pressure is decreased; i.e., the rearrangement of the material near the edge is exceedingly slow under these low pressure conditions.

Another flaw in the curves is an occasional bump of too great a magnitude to be of instrumental origin. This appears to be due to the lack of a precisely uniform layer of material between the diamonds, as it too occurs with the less compressible materials. Another cause of such defects is the occasional formation of "materials streams" during the extrusion of the sample from the cell on initial compression. The subsequent fissure

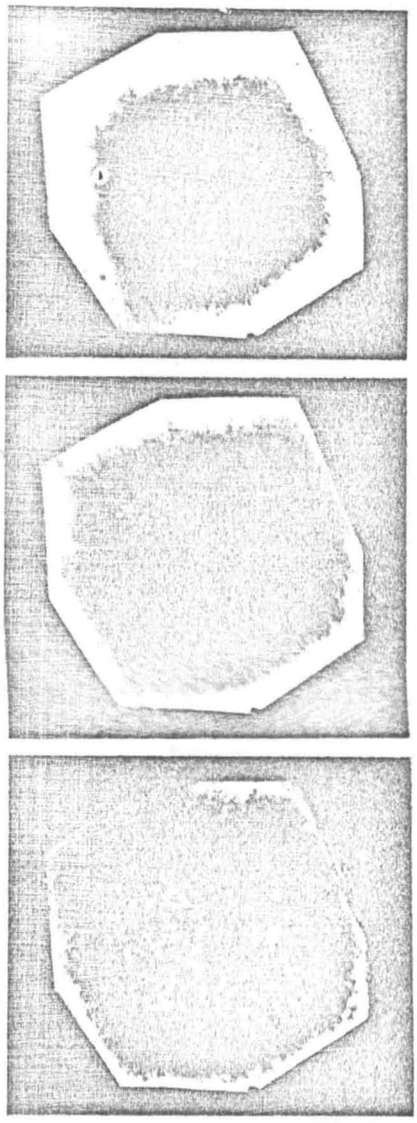

Fig. 8 Photos of $Ni(DMG)_2$ in cell taken at various wavelengths

formation within the sample prevents a completely uniform redistribution of the sample. In some cases where the materials streams are quite large, and numerous, a steeper pressure gradient is observed, simply because the lower effective contact area results in a higher average pressure.

A third problem which can be observed in some of the data reported is that of obtaining an exactly uniform distribution about the center of the diamond. At the time the measurements were made, fine adjustments of the diamond alignment were not made on each compression because we were looking for the effect of increased pressure on the alignment of the diamonds. In this regard, we learned that the diamonds have little or no "self-aligning" tendency. While this may at first appear to be a disadvantage, it is a very desirable