

DISCUSSION

1. General

The data obtained from the first forty runs, with the exception of those made at ambient pressure, were rendered essentially useless by the large amount of experimental scatter. It is believed that this scatter came about from three primary causes:

1. The error in temperature measurement due to not having the thermocouple in contact with the sample crystal.
2. The lack of correlation between the oil pressure to the rams and the actual pressure applied to the crystal due to a lack of uniformity in sample design.
3. Too short of anneal times due to a lack of knowledge of the order of magnitude of the diffusion constant at high pressures.

In the later runs, the uncertainty in the temperature of the anneal was reduced to an estimated plus or minus 5 C° by improvements in the sample design (Figure 3) and temperature regulating device. The effect of the sample design on the pressure calibration is seen in Figure 13. The change in calibration here is caused by samples that differed only in length of tube heater. This problem was a result of the apparently high compressibility of the pressure transmitting media. In later runs care was taken to insure uniformity of sample design.

If the anneal time is too short, the uncertainty in the diffusion constant is high due to the extraneous diffusion that occurs during