thermocouple used in one run was made using the Curie temperature of iron as a standard. Mallinckrodt reagent grade iron wire gave a Curie temperature, on both heating and cooling, of 767 to 768°C, which compares favorably with the widely-quoted (Boulanger, 1955) value of 769°C.

The data from the runs are plotted in Figure 1. At 1 bar, the transition temperature is 584°, with a precision of ±1°C. The data in Figure 1 may be fitted by a straight line of slope 26.0 ± 0.5 deg kbar^{-1} and no curvature is indicated, within the experimental precision.

Discussion

The transition temperatures obtained here at 1 bar are consistent with the values obtained by other workers, *e.g.*, 586 ± 2°C (Beck, 1949), 581 ± 1° (Troccaz *et al*, 1967), and 580° (Flörke and Lachenmayr, 1962), although some workers report significant hystereses. However, Lang *et al* (1969), in establishing that the transition is first order, report no hysteresis for the transition temperature at 579°C. Troccaz *et al* (1967) also indicate high and low berlinite coexisting over a range of temperature near the inversion, which is not corroborated by other investigators.

Shafer and Roy (1957) were unable to detect *any* indication of the transition by *dta*. Assuming that the transitions were first order in both quartz and berlinite, they estimated an upper limit for ΔH in berlinite to be less than 1/50 that of low-high quartz. Troccaz *et al* (1967) gave estimates for values of ΔV and ΔH at the transition. Substituted into the Clausius-Clapeyron equation, $dT/dp = \Delta V/\Delta S$, a slope of 35 ± 7 deg kbar^{-1} is obtained. This is beyond agreement with the present results, which is not surprising, since Troccaz *et al* did not distinguish between the rapid variations near the transition temperature and the actual discontinuities (first order component).

By analogy with low-high quartz (Coe and Paterson, 1969), it is likely that thermal effects of a lambda transition are superimposed on the first-order inversion in berlinite and that very careful and closely-spaced measurements are necessary to establish the discontinuity in thermophysical properties.

The similarities between the high-low berlinite and high-low quartz inversions have been well emphasized (*e.g.*, Beck, 1949; Flörke, 1967). Small differences, such as the ~10° difference in transition temperatures and small differences in molar volumes at 1 bar, have been recognized although the properties of berlinite are not that firmly established near the inversion, and it is very probable that other small differences would appear upon careful measurement. On the other hand, the present measurements emphasize only the similarities between the berlinite and quartz inversions, since the slopes of the two phase boundaries are identical (Cohen and Klement, 1967).

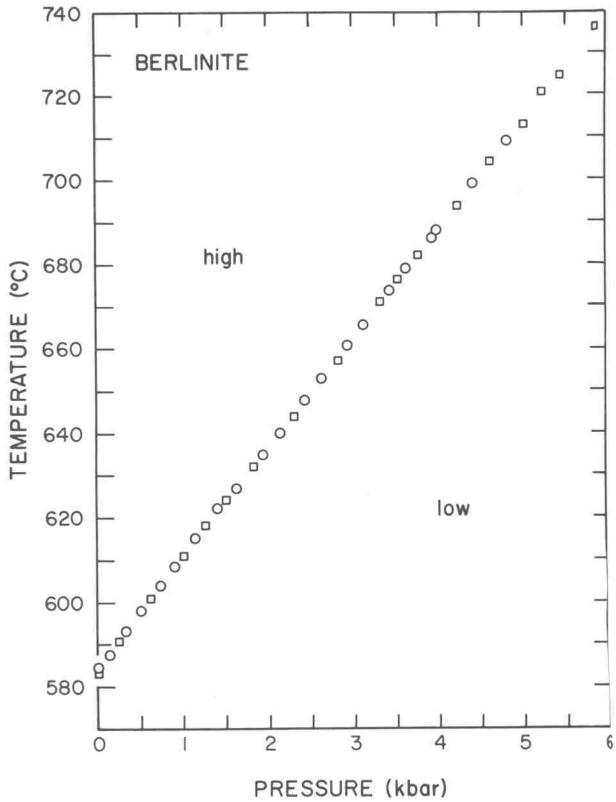

FIG. 1. Variation with pressure of the high-low berlinite inversion temperatures. The circles represent data obtained on both increasing and decreasing pressure in the first run; the squares represent similar data from the second run.

Acknowledgment

Equipment used in this investigation was maintained under NSF grant GA-27618.

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Manuscript received, February 22, 1973; accepted for publication, March 21, 1973.