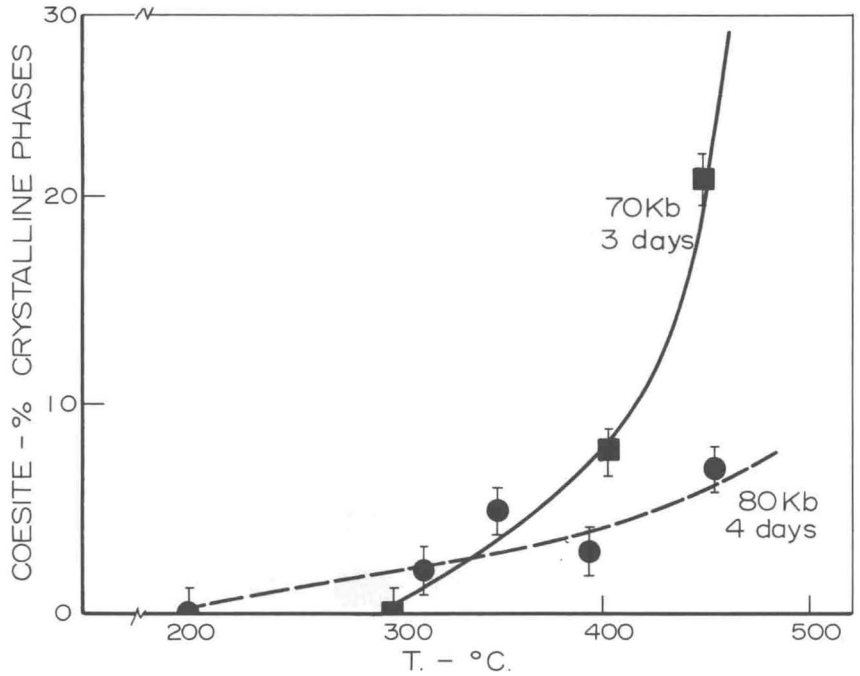

FIGURE 3—Trend with temperature at 70 and 80 kbars of the stishovite-coesite reaction.

150°C downward in the quartz phase region. The SRO zone again lies below the partial conversion zone and is somewhat reduced.

The effect of mineralizers is negligible at pressures above 70 kbars, so that the zone boundaries are essentially the same whether the material is "wet" or "dry." Mineralizers therefore have their greatest effect on the reversal reactions at lower pressures.

Shear System. Incorporating shear stresses in a number of experiments did not produce any detectable difference with respect to the "dry" system. Representative examples are given in Table I. In this technique, wafers were made without the nickel ring. Under shear, the extreme toughness of stishovite became apparent in that a number of the tungsten carbide anvil faces were pitted or indented by the sample which, at times, would "ball up" under the oscillation. The applied pressure was recalculated in accordance with the projected area of the pellet when removed; thus the pressures were not as accurately known in comparison with the non-shear experiments.

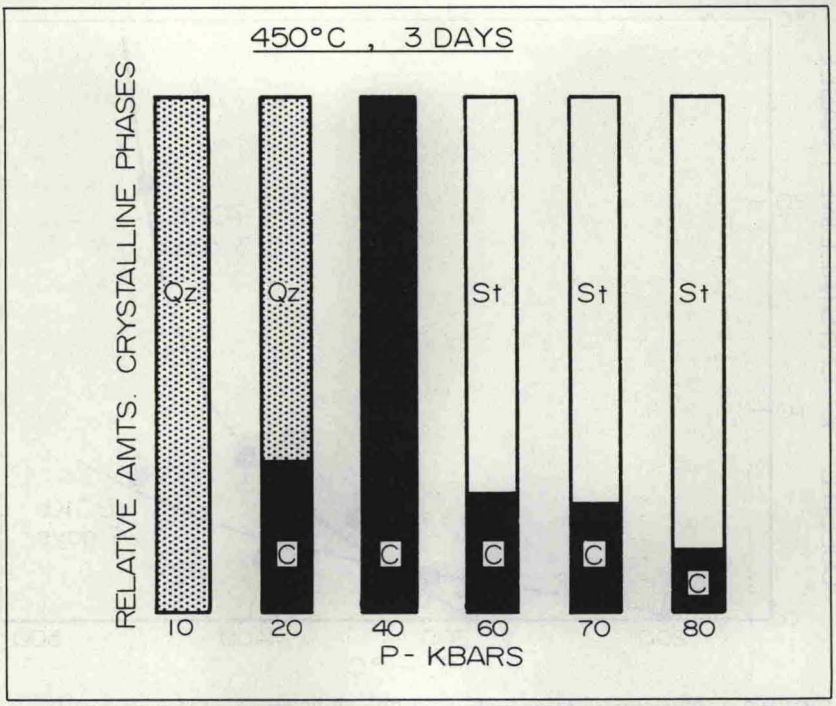

FIGURE 4—Effects of pressure on the reversal reaction of stishovite at 450°C. The products are quartz (Qz), coesite (C), and stishovite (St), respectively.

GENERAL

The infrared spectrum of SRO derived from stishovite under pressure was of interest because it might reveal a second form of silica having Si in 6 coordination. Such a form, of course, would have value in studies of shock metamorphism. Tracings of representative spectra are shown in Figure 6. The first is of stishovite and the last two are of silica glass and quartz, respectively. The mean cation-anion stretching frequency of the latter occurs between 1050-1150 cm^{-1} and is characteristic of Si in 4 coordination. For stishovite with Si in 6 coordination, the absorption is between 950-850 cm^{-1}, as could be predicted by the method of Dachille and Roy (1959 b). The second, third, and fourth correspond to spectra of reaction products (Stishovite + SRO) containing increasing concentrations of SRO. Comparison of the spectra shows a rapid shift from the stishovite to the glass-quartz type pattern. The conclusion is that Si is clearly in 4 coordination in the SRO phase and the SRO phase must be very similar to silica glass with respect to structure.