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92. HIGH TEMPERATURE HIGH PRESSURE RELATIONS OF SOME AX_2 and ABX_4 PHASES. Frank Dachille and Rustum Roy, Department of Geophysics and Geochemistry, College of Mineral Industries, Pennsylvania State University, University Park, Pa.

The polymorphism of compounds homotypic with one of the modifications of SiO_2 has been examined in the temperature range up to 1700°C. (at 1 atm.) and pressure range up to 60,000 atm. (below 650°C.).

The dependence of existing polymorphs on ionic size is clearly demonstrated, although no pattern whatever appears in the temperatures of the various polymorphic transitions. Enthalpy and entropy changes for their transitions likewise show no regularities.

The cristobalite structure phases such as BPO_4 and $BAsO_4$ are converted to quartz structures at high pressures (<50,000 atm.). Single crystal data show clear-cut ordering with a doubled 'C' axis. Quartz structure phases are converted either to coesite--e.g., BeF_2--or a more complex but possibly related structure ($AlPO_4$, $FePO_4$, $GaPO_4$). Pressure temperature and free energy-temperature relations are presented for most phases.