

at that wattage for three minutes. The sample was quenched by shutting off the power and allowed to remain at pressure for one minute longer after which the pressure was released over about a thirty second period.

The sample was removed from the BN tube, crushed between two polished WC anvils, loaded in an X ray capillary tube and an X ray diffraction pattern taken at once.

Runs were made from pressures of 15 to 70 kilobars. Temperatures of 600 to 1000 °C were used at the lower pressures and 600 to 1800 °C at the higher pressures. Enough runs were made for each system to define the reaction product boundaries. The boundaries were defined to  $\pm 3$  kilobars and about  $\pm 100$  °C. Reaction products were identified by their X ray powder diffraction patterns.

The results obtained from each system are summarized in Table 2 and shown in Figures 5 through 11.

#### Lanthanum

Only  $\text{La}_2\text{O}_3 + \text{Sb}$  were obtained from 40 to 60 kilobars for temperatures above 1000 °C. At lower temperatures there was no reaction. The oxygen apparently migrated into the sample from the pyrophyllite.

#### Cerium

Only  $\text{CeO}_2 + \text{Sb}$  were obtained from 20 to 65 kilobars for temperatures up to 900 °C. At higher temperatures  $\text{Ce}_2\text{O}_3 + \text{Sb}$  were obtained.