

5. At pressures between 10 and 50 kilobars and temperatures above 1000 °C an X ray diffraction pattern which matched that of NdSb<sub>2</sub> was obtained which verified the synthesis of LaSb<sub>2</sub> type GdSb<sub>2</sub>, a new compound. At lower temperatures and pressures below 20 kilobars cubic GdSb plus Sb were obtained. At temperatures below 900 °C and pressures between 25 and 35 kilobars a mixture of GdSb and unidentified products was obtained. The cubic lines of GdSb could easily be picked out of the X ray diffraction pattern but there were several additional weak lines which were not identified. This phase was called "unknown product, type I". At pressures above 40 to 50 kilobars and temperatures high enough to obtain reaction, a new phase was observed. The X ray diffraction pattern of this phase could be indexed with an orthorhombic structure containing two molecules per unit cell. This orthorhombic structure is quite different from the LaSb<sub>2</sub> type reported for rare earth diantimonides by Wang and Steinfink (1). This structure was called the "high pressure orthorhombic" phase.

Different mixture ratios of Gd plus Sb were prepared and used to see if this high pressure orthorhombic phase was a compound or a solid solution. For an equimolar mixture of Gd plus Sb only GdSb was formed at 60 kilobars and 1100 °C. For a 2 to 3 molar mixture of Gd plus Sb, the high pressure orthorhombic structure was observed with the same lattice parameters as found in the 1 to 2 molar runs.