requirements of sulfur (19).

The sesquisulfide, Dy_2S_3, is found in a monoclinic form as well as the Th_3P_4 cubic structure. The heavier rare earths Ho to Tm have only monoclinic sesquisulfides (2), (6). Y_2S_3 is also found only in the monoclinic form (20) while Yb_2S_3 exists in a rhombohedral form as well as an orthorhombic modification (21), (22). Lu_2S_3 is known only in a rhombohedral form (22). The orthorhombic Yb_2S_3 displays homogeniety from Yb_2S_3 to Yb_3S_4 (21).

The work discussed above shows that a change of structure is observed in the rare earth sesquisulfides at Dy_2S_3. Compounds of lighter lanthanides exist in a cubic form and compounds of heavier elements exist in a monoclinic, orthorhombic or rhombohedral structure. Since the cubic form is considerably more dense than the monoclinic form and has a higher coordination number (eight for the rare earth metal in the cubic form and six in the monoclinic) it seemed very probable that the monoclinic form could be converted to the cubic form using high pressure techniques. Part of the present work was performed to determine if this could be done.

Densities of the monoclinic, orthorhombic, rhombohedral and cubic forms of the rare earth sesquisulfides (2), (6), (21) which served as the basis for predicting that the transformations could be carried are shown in Figure 1.