

#### IV. SYNTHESIS STUDIES OF RARE EARTH DIANTIMONIDES

Synthesis studies were carried out on all of the lanthanides except Pm and also on Sc and Y.

The rare earth metals were obtained from Research Chemicals of Phoenix, Arizona and Alfa Inorganics of Beverly, Massachusetts and were 99.9 per cent pure. The antimony was obtained from Mallinckrodt Chemical Works of New York and was 99.8 per cent pure, reagent grade metal. The rare earths were filed and the filings sieved through a 100 mesh nylon sieve and used immediately. The antimony was ground with a mortar and pestle and sieved through a 200 mesh nylon sieve. Mixtures of one mole rare earth to two moles of antimony were prepared and hand mixed for several minutes in a plastic vial.

The pyrophyllite tetrahedrons were prepared as shown in Figure 3 and the sample loaded in the BN tube. The sample was compressed by hand with a metal tamp and the completed tetrahedron painted with a slurry of rouge in methanol, dried at 110 °C for at least one hour and allowed to cool in a dessicator.

The completed sample was placed in the press and compressed to the desired pressure. The power was raised to the desired wattage over about fifteen seconds and held