ROUGH DRAFT

Memo to Eliot A. Butler

Re: Use of Mass Spectrograph in High Pressure Research

Brigham Young University has had a continuous effort in the synthesis of new inorganic compounds by means of high pressure and high temperature since 1956. Our studies have shown that it is easy to make new compounds by these techniques. However, the compounds are made in milogram quantities, mixtures rather than pure substances as usually obtained, and analysis is very difficult. As a matter of fact it can be clearly stated that the major problem connected with the synthesis of many substances by high pressure-temperature means lies in the analysis of the products.

Brigham Young University has just constructed a new high pressure research facility of 5000 square foot area. Eight professors and fifteen graduate students are currently working in this facility. In many respects we have the world's most well equipped laboratory for simultaneous studies for high pressure and high temperature. However, the laboratory very seriously needs diagnostic tools for examining the products formed in high pressure experiments. A particularly needed tool is a mass spectrograph equipped for analyzing inorganic substances formed from atoms of low atomic weight. These substances usually have very high melting and boiling points. Many of the new substances being produced by high pressure-temperature techniques have extreme scientific interests (for example, the periodic compound concept recently developed by H. T. Hall). In addition, many of the compounds have practical interests particularly in the field of semiconductors and abrasives.

One prospect of current research is that of producing an inorganic substance that is harder than diamond. There is great importance attached to both the scientific and the practical aspects of this problem. It is a problem that has intrigued high pressure workers since the days of P. W. Bridgman.

I would place a mass spectrograph capable of handling high boiling points, low molecular weight inorganic compounds as the number one diagnostic tool needed by the University high pressure laboratory.

H. Tracy Hall