

INTRODUCTION

This is the third quarterly progress report on a program of study of the effect of hydrostatic pressure on the deformation behavior of beryllium single crystals tested in c-axis compression. Two levels of material purity are included in the study program.

Progress this quarter has included continued c-axis compression testing of both ingot purity and zone leveled (low purity) single crystal specimens to a maximum hydrostatic pressure of 293 ksi at room temperature. Optical and electron microscope examination of the tested crystals indicate that substantial pyramidal deformation occurs in the pressure range 250 to 300 ksi. These observations are described in detail in the body of this report. Progress has also continued in the design and construction of the FIRL constant pressure test apparatus. The preparation of oriented and electropolished c-axis compression test specimens has also continued during this quarter.

HYDROSTATIC PRESSURE EQUIPMENT

A sub-press assembly for aligned, axial loading of the c-axis compression specimens was completed during the early part of this quarter. This assembly was used to conduct four c-axis compression tests over the hydrostatic pressure range 145 ksi to 293 ksi. All these tests were successful in that the high stresses at fracture indicated that true axial loading (or very nearly so) had been accomplished.

A detailed design of the high pressure vessel for this FIRL High Pressure test assembly has been prepared and the vessel itself has been substantially completed. This pressure vessel is shown in Figure 1. This figure supplements and completes Figure 2 of Q-C1880-1.