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Resistometric measurements were made on Bi to pressures in excess of 300 kbar. Reproducible resistance drops were observed at a pressure near 300 kbar. The related transition has been identified as the Bi VI-IX transition.

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Recently, the considerable effort being made to reach extremely high pressures has emphasized the lack of reproducible and easy-to-observe calibration transitions for pressure levels above 150 kbar.[1-5]

A recent study of the Bi phase diagram from liquid helium to room temperature[6] revealed the existence of six phase transitions first reported by Bridgman.[7] The Bridgman V-VI transition, which occurs at 72-74 kbar on the 1970 Drickamer pressure scale,[1] is presently referred to as the Bi III-V transition. Since this laboratory and others[8-11] clearly observe the III-IV and IV-V Bridgman transitions using extremely sensitive resistometric techniques, we have readopted the Bridgman phase notation.[7]

In the previous paper, Homan observed two new low-temperature phases of Bi which he labeled Bi VIII and Bi IX. A triple point Bi VI-VIII-IX was found near 130 kbar and 250 °K; however, determination of the phase line Bi VI-IX was beyond the scope of that paper.[6] Extrapolation of this phase line suggested that the room-temperature Bi VI-IX should occur well above 140 kbar.

Figure 1 shows a typical resistance—vs—jack-pressure trace for a foil-type Bi specimen run in a new type of pressure cell developed by Kendall *et al.*[2] The discontinuity at a jack load of 3000 psi is the point at which the voltage amplification was increased by a factor of 10 to facilitate increased measurement sensitivity. Also, it should be noted that the Bi III-IV and Bi IV-V transitions, the positions of which are shown on

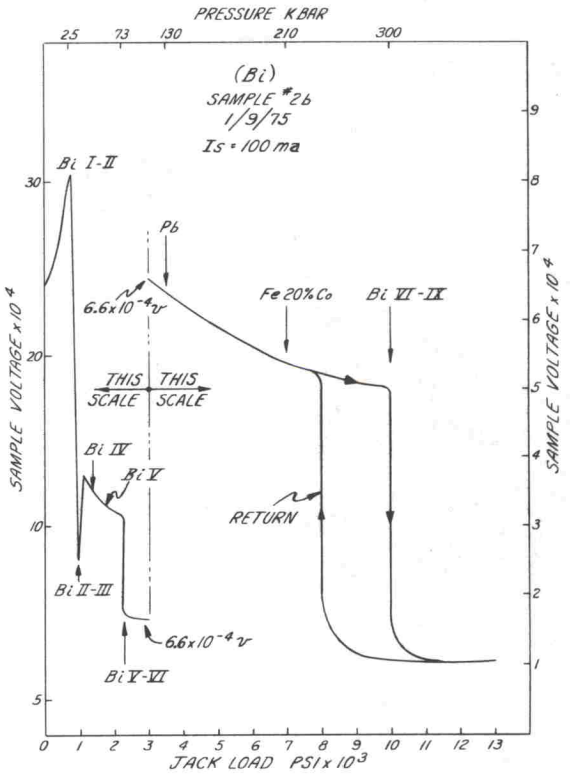

FIG. 1. Room-temperature resistometric trace of Bi foil sample. The Bi III-IV, Bi IV-V, Pb, and Fe 20% Co transitions observed on other specimens are indicated. The Bi III-IV and Bi IV-V require sensitivity increases of a factor of 50 to be clearly observed, while the Pb and Fe 20% Co are observed on dual samples. Note the change in scale at a jack load of 3000 psi.

the plot, were not observed in this particular series of experiments due to the relatively low voltage amplification. They can be readily observed if the voltage is further amplified by a factor of 50.

Referring to Fig. 1, the new Bi VI-IX phase transition occurs at a jack pressure of 10 200 ± 400 psi, is very abrupt, and involves a relatively large resistance drop.

A Pb-Bi dual-foil specimen was also run indicating the Pb transition, which occurs at 130 kbar, at a jack load of 3500 psi. Comparing these jack pressures with the calibration curve developed by Kendall *et al.*[2] up to the Fe 20% Co transition at 210 kbar indicates that the new Bi VI-IX transition occurs at approximately 300 kbar at ambient temperature.

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