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ELECTRICAL RESISTANCE OF BARIUM
AT ELEVATED PRESSURE AND TEMPERATUREB. C. Deaton and D. E. Bowen*
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General Dynamics/Fort Worth, Fort Worth, Texas① Phase change or
polymorphism

② Barium

Experimental results on the melting and polymorphism of barium at elevated temperature and pressure were first reported in 1963, the measurements being made by differential thermal analysis¹. We report here data on the electrical resistance of barium wire samples at pressures to 67 kilobars (kb) and temperatures to 800°C. Bridgman has published data on room temperature resistance discontinuities in barium at 17 and 59 kb^{2,3}, and more recently, Balchan and Drickamer⁴ found a sharp discontinuity in resistance near 144 kb. Since it has been tentatively assumed that the room temperature transition at 144 kb corresponds to melting^{1,5}, it was felt that a study of the resistance upon melting at lower pressures could definitely provide information on the validity of this assumption. In fact, our resistance melting curves are quite similar to those of Stager and Drickamer⁵ and our data thus lend evidence to the fact that barium may be liquid at room temperature above 144 kb.

The measurements were made using a tetrahedral anvil device described previously^{6,7}. The pyrophyllite sample tetrahedrons contained a graphite heater with stainless steel current leads, inside of which was placed a cylinder of pyrophyllite, boron nitride or AgCl containing both the barium sample and a chromel-alumel