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# Electrical Resistance of Copper-Gold Alloys at Low Temperatures\*

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## Abstract

Electrical resistance of the copper-gold alloys containing 5.0<sub>6</sub>, 24.1, 25.0<sub>7</sub>, 50.8, 74.0 and 75.0<sub>6</sub> at. % gold was measured in the range from liquid helium to room temperature in the annealed and quenched states. It was established that the residual resistance of the 75.0<sub>6</sub> per cent alloy is lower in the ordered state than in the disordered one, and that the ratios of the residual resistance to the ice point resistance are 0.699 and 0.800 for the ordered and disordered states, respectively. Also it was found for the 74.0 per cent alloy that the residual resistance of the partly ordered state is higher than that of the disordered state. The Debye temperatures of the alloys were evaluated by using the Grüneisen formula. 185° and 160°K were obtained for the 75.0<sub>6</sub> per cent alloy in the ordered and disordered states, respectively.

A resistance minimum of the magnitude of 0.01  $\mu\Omega$ -cm was found in the neighborhood of 13°K for the 25.0<sub>7</sub> per cent alloy. Such a minimum seems to be little affected by the degree of order, and was thought to be due to the presence of small amounts of certain impurities. This view was supported by an appearance of more distinct minimum near 19°K for the 23.5<sub>7</sub> per cent alloy containing 0.16 per cent iron as an impurity.

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