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## Tensile properties and conductivities of a precipitation hardened and cold-rolled Cu-0.3Cr-0.1Zr alloy at cryogenic temperature

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The National Research Institute for Metals (NRIM: now NIMS) has accumulated physical and mechanical properties at cryogenic temperatures for structural alloys since 1980s. As a part of the work, electrical resistivity, magnetization, thermal conductivity and tensile properties were determined at cryogenic temperatures for precipitation hardened copper-based alloys as well as OFHC Cu in the cold-rolled condition (in: Handbook of Superconductivity and Cryogenics, Ohmsha, Tokyo, 1993), since few cryogenic data for those alloys were available. Cu-0.3%Cr-0.1%Zr alloy (CuCrZr) is one of typical precipitation hardened copper-based alloys, and exhibited an excellent combination of high strength and high electrical conductivity at the temperature range of 4 K to 300 K. The CuCrZr showed higher yield ratio (yield stress/tensile strength) at cryogenic temperature than oxygen free copper (OFC), but the ratio of yield stress to electrical resistivity was lower than. The thermal conductivity of CuCrZr was twice as high as that of phosphorous-deoxidized copper. The CuCrZr exhibited excellent non-magnetic stability and very low magnetic permeability at 4.2 K.

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