

Yield stress of monocrystalline rhenium nanowires

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ABSTRACT

The yield stress of monocrystalline Rhenium nanowires grown by directional solidification was measured by nanobending testing. The average yield stress calculated from the deflection was between 10 and 60 GPa, which represents roughly 10% of the rhenium Young modulus along the nanowire's direction. Analytical results are compared to the ones obtained with a more complex finite element simulation. Origins of the experimental observed yield stress values variations are discussed in terms of experimental measurement errors, elastic anisotropy, and the presence of an oxide layer on the nanowire surface.