

# Impressive tensile properties development of Ta<sub>0.5</sub>Nb<sub>0.5</sub>Hf<sub>0.5</sub>ZrTi<sub>1.5</sub> future generation refractory high entropy alloy

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## Abstract

The microstructure, texture, phase stability, and tensile properties of annealed Ta<sub>0.5</sub>Nb<sub>0.5</sub>Hf<sub>0.5</sub>ZrTi<sub>1.5</sub> alloy have been investigated in the present research. The alloy was severely hybrid-rolled up to 93.5% thickness reduction, subsequently rolled samples subjected to an annealing treatment at 800°C and 1000°C temperatures for 1h. Consequently, the rolled condition and both annealed temperatures have a body-centered cubic (BCC) structure. Furthermore, quantitative texture measurements (ODF analysis) and microstructural examinations (analytical EBSD maps) permitted to establish a good relationship between annealing texture and microstructure and UTM utilized for obtaining the mechanical properties. Impressive room temperature tensile properties combined with the tensile strength (1380 MPa) and (24.7%) elongation achieved for the 800°C heat-treated condition. The evolution of the coarse microstructure featured in the case of 1000°C annealed temperature ascribed to the influence of high thermal energy.

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