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Mechanical and Microstructural Properties of Rotary-Swaged Wire of Commercial-Purity Titanium

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Abstract : Bars made of titanium grade 2 and grade 4 were subjected to rotary forging with up to 2.2 true strain reduction in the cross-section from 10 to 3.81 mm. During progressive deformation, grain refinement in the transverse direction took place. In the longitudinal direction, ultrafine microstructure has not developed. It has been demonstrated that titanium grade 2 strengthens more than grade 4. The ultimate tensile strength increased from 650 MPa to 1040 MPa in titanium grade 4. Hardness profiles on the cross section in both materials show an increase in the centre of the wire.

Keywords : commercial-purity titanium, wire, rotary swaging, tensile test, hardness, modulus of elasticity, microstructure
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