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Obtaining high strength-ductility combination in titanium by ambient temperature multiaxial plane-strain forging and rolling

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Severe plastic deformation of polycrystalline pure titanium was carried out by a novel process nomenclated as multiaxial plane-strain forging followed by rolling at ambient temperature [1]. A twin-free nanostructure with an unusual multi-component basal texture was obtained after the overall effective strain of $\varepsilon_{eff} \sim 5.0$ [1, 2]. This unique combination of two plane strain processing lead to the highest tensile strength-ductility combination of 990 MPa and 0.36 along with high texture anisotropy $(\bar{R} = 1.56, \Delta R = 0.09)$ suitable for high formability and deep-drawing [1]. The mechanical properties obtained are compared with previously published works.

Keywords: Titanium; forging; rolling; nanostructure; texture; ductility;

References:

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