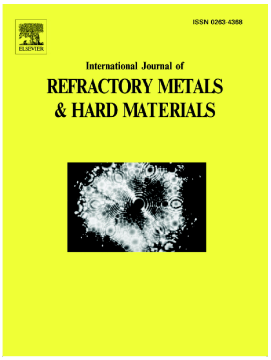

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Effects of asymmetrical rolling on through-thickness microstructure and texture of body-centered cubic (BCC) tantalum

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ABSTRACT

In conventional symmetric rolling (SR), the microstructure and texture inhomogeneities along the thickness are intractable problems for body-centered-cubic (BCC) metals with high stacking fault energy. In this study, high-purity tantalum was selected as a representative case, and a new asymmetrical rolling (ASR) technique was developed to alleviate this inhomogeneity. Specimens were rolled to 80% thickness reduction using 90-degree cross SR and 90-degree cross ASR; two different rolling speed ratios, namely, 1.1 and 1.2, were adopted in ASR. The through-thickness texture and microstructure were characterized via X-ray diffraction and electron backscatter diffraction. Results showed that the ASR deformed specimens presented more homogeneous through-thickness microstructure and texture than SR-deformed