

Author's Accepted Manuscript

Elastic and plastic properties of as-cast equimolar TiHfZrTaNb high-entropy alloy

G. Dirras, L. Lilensten, P. Djemia, M. Laurent-Brocq, D. Tingaud, J.-P. Couzinié, L. Perrière, T. Chauveau, I. Guillot



PII: S0921-5093(15)30714-0
DOI: <http://dx.doi.org/10.1016/j.msea.2015.12.017>
Reference: MSA33100

To appear in: *Materials Science & Engineering A*

Received date: 16 October 2015
Revised date: 9 December 2015
Accepted date: 11 December 2015

Cite this article as: G. Dirras, L. Lilensten, P. Djemia, M. Laurent-Brocq, D. Tingaud, J.-P. Couzinié, L. Perrière, T. Chauveau and I. Guillot, Elastic and plastic properties of as-cast equimolar TiHfZrTaNb high-entropy alloy, *Material Science & Engineering A*, <http://dx.doi.org/10.1016/j.msea.2015.12.017>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and a review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Elastic and plastic properties of as-cast equimolar TiHfZrTaNb high-entropy alloy

G. Dirras^{1,*}, L. Lilensten², P. Djemia¹, M. Laurent-Brocq², D. Tingaud¹, J.-P. Couzinié²,
L. Perrière², T. Chauveau¹, I. Guillot²

¹Université Paris 13, Sorbonne Paris Cité, LSPM (UPR 3407), CNRS, 99 Avenue J.B.
Clément 93430 Villetaneuse, France

²Université Paris Est, ICMPE (UMR 7182), CNRS, UPEC, 94320 Thiais, France

*Corresponding author: dirras@univ-paris13.fr – Tel: +33 1 49 40 34 88; Fax: + 33 1
49 40 39 38

Abstract

Elastic properties of as-cast TiHfZrTaNb high entropy alloy were investigated by ultrasound measurements, yielding $G = C_{44} = 28$ GPa and $C_{11} = 172$ GPa effective isotropic elastic constants, allowing computation of the Young's modulus E , the bulk modulus B and Poisson ratio ν of about 78.5 GPa, 134.6 GPa and 0.402, respectively. A Pugh ratio G/B as lower as 0.208 and high positive Cauchy pressure $(C_{12}-C_{44}) = 80$ GPa were calculated, suggesting a ductile behavior. Tensile tests were carried out on specimens taken along the ingot diameter to address micro-segregations effect on the macroscopic behavior. More specifically, micro-segregations were addressed at a smaller scale via nanoindentation measurements. Given the observed low deviations from both tensile and nanoindentation experiments, micro-segregations influence was concluded to be negligible. The necking and fracture surface investigations revealed multiples slip bands, grains boundary distortions, mixture of shallow and profound

Download English Version:

<https://daneshyari.com/en/article/7975531>

Download Persian Version:

<https://daneshyari.com/article/7975531>

[Daneshyari.com](https://daneshyari.com)