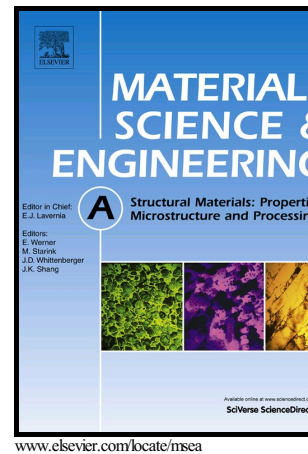


Author's Accepted Manuscript

Microstructural evolution and age hardening behavior of a new metastable beta ti-2Al-9.2Mo-2Fe alloy

Cheng-Lin Li, Xu-Jun Mi, Wen-Jun Ye, Song-Xiao Hui, Dong-Geun Lee, Yong-Tai Lee



PII: S0921-5093(15)30273-2
DOI: <http://dx.doi.org/10.1016/j.msea.2015.08.028>
Reference: MSA32662

To appear in: *Materials Science & Engineering A*

Received date: 29 April 2015
Revised date: 11 July 2015
Accepted date: 6 August 2015

Cite this article as: Cheng-Lin Li, Xu-Jun Mi, Wen-Jun Ye, Song-Xiao Hui, Dong-Geun Lee and Yong-Tai Lee, Microstructural evolution and age hardening behavior of a new metastable beta ti-2Al-9.2Mo-2Fe alloy, *Materials Science & Engineering A*, <http://dx.doi.org/10.1016/j.msea.2015.08.028>

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 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.

Microstructural evolution and age hardening behavior of a new metastable beta Ti-2Al-9.2Mo-2Fe alloy

Cheng-Lin Li ^{a,*}, Xu-Jun Mi ^a, Wen-Jun Ye ^a, Song-Xiao Hui ^a, Dong-Geun Lee ^b, Yong-Tai Lee ^c

^a General Research Institute for Nonferrous Metals, Beijing, 100088, RP China

^b Sunchon National University, Suncheon, 540-950, Korea

^c Korea Institute of Materials Science, Changwon, 642-831, Korea

Corresponding Author:

Cheng-Lin Li

Email: chl211.lee@gmail.com

Address: General Research Institute for Nonferrous Metals, Beijing, 100088, RP China

Abstract

A study on microstructural evolution and age hardening behavior of a new metastable beta titanium alloy Ti-2Al-9.2Mo-2Fe was undertaken by microscopic observation, Vickers hardness and tensile tests in this research. The result showed that the athermal ω phase was formed in the beta matrix after solution treatment and followed by water quench, but it seemed that the athermal ω phase did not result in a considerable hardening (300 HV in hardness and 670 MPa in YS in ST condition). However, the isothermal ω phases with 10 ~ 40 nm and nano-scaled α platelets with 30 ~ 100 nm were observed in the alloy aged at lower temperatures (300 ~ 450 °C). The nano-scaled ω and α phase led to an attractive hardening effect (400 ~ 500 HV in hardness and above 1500 MPa in YS). However, micro-scaled α phase with 0.5 ~ 3 μm obtained in the samples aged at temperatures (500 ~ 600 °C) showed a moderate hardening (350 ~ 450 HV in hardness and 1100 ~ 1500 MPa in YS). The hardening went through an under-aging, peak-aging and over-aging due to the continuation of nucleation and growth of the α phases and subsequent coarsening. The coarsen α phases (3 ~ 5 μm) and grain boundary α layers (0.1 ~ 0.5 μm in thickness) obtained at high temperatures aging (650 ~ 750 °C) showed a poor hardening or even a softening (around 300 HV in hardness and below 1000 MPa in YS). The Ti-2Al-9.2Mo-2Fe

Download English Version:

<https://daneshyari.com/en/article/7976954>

Download Persian Version:

<https://daneshyari.com/article/7976954>

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