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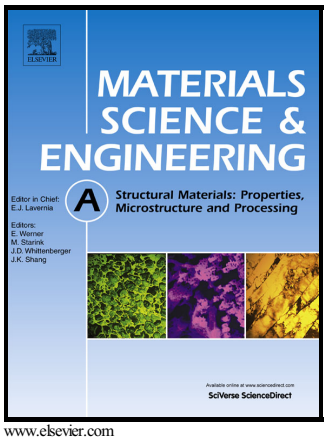

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Microstructure and Mechanical behavior of hot compressed Ti-6V-6Mo-6Fe-3Al

S.M. Abbasi[1], A. Momeni[2*], A. Akhondzadeh[1], S.M. Ghazi Mirsaed[1]

1- Advanced Materials Research Laboratory, Metalic Materials Department, AMR of Technology, Tehran, Iran.

2- Department of Materials Science and Engineering, Hamedan University of Technology, Hamedan, Iran.

Abstract

Hot compression tests were carried out in temperature range of 680 °C-880 °C and at strain rates of 0.001 s^{-1}-1 s^{-1} on Ti-6V-6Mo-6Fe-3Al beta titanium alloy. The stress-strain curves showed yield point phenomena, especially at high strain rates and low temperatures. A polynomial equation was developed to relate the yield drop to the Zener-Hollomon parameter. It was found that the yield drop reach a maximum and remanis nearly constant at high values of the Zener-Hollomon parameter (lnZ > 30). The flow curves at high temperatures and low strain rates were typical of dynamic recovery. However, at low temperatures and high strain rates (27 < lnZ< 31), dynamic softening with the negative work hardening rate was observed at high strains. The microstructural observations showed that the dynamic softening was associated with partial dynamic recrystallization in which numerous grain boundary bulges was formed.

Key words: Timetal 125; Hot compression; Dynamic recovery; Dynamic recrystallization; Discontinuous yielding.

* Corresponding author: Tel.: +98-81+38411513, ammomeni@aut.ac.ir

1- Introduction

Titanium alloys can be categorized into three major groups depending upon their microstructures. The first group which includes alloys rich in Mo, V and Nb are named as