Role of Ge on the slip activity in Ti-6Al-4V

K.N. Chaithanya Kumar, Ninad A. Vaidya, Sidhaant Vasudeva, K.S. Suresh[a]

Department of Metallurgical and Materials Engineering, Indian Institute of Technology Roorkee, Uttarakhand 247 667. INDIA.

[a]*ks.suresh@mt.iitr.ac.in*

Microstructural engineering in titanium alloys is quite efficient in controlling the mechanical properties by varying the phase fractions, morphology from lamellar to equi-axed or bimodal. In this context, globularization of α phase is crucial for energy efficient production of structural components and addition of Ge to near α Ti alloy has been proved to accelerate the transition of lamellar to equi-axed morphology through restriction of slip at the interfaces [1]. Therefore, in the present study, the role of Ge addition to Ti-6Al-4V alloy has been investigated in terms of type of slip, role of Schmid factor and transition from single slip to poly slip as a function of deformation strain. Sheets of Ti-6Al-4V alloy, with and without Ge has been cold rolled up to 20 % thickness reduction and the slip activities were monitored through interrupted characterization using electron back scattered diffraction (EBSD). Contrary to the conventional studies, significant pyramidal slip has been activated with varying Schmid factors. A combined effect of higher oxygen content and Ge addition have been attributed to the enhanced pyramidal slip activity.

Keywords: Ti-6Al-4V, slip activity, Schmid factor, orientation gradient, EBSD

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References:

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