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Deformability of the Rare Earth Metal Modified Metastable-β Alloy Ti-15Mo

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Abstract : Due to reduced stiffness, research on second generation titanium alloys for implant applications, like the metastable β-titanium alloy Ti-15Mo, become more and more important in the recent years. The machinability of these alloys is generally poor leading to problems during implant production and comparably large production costs. Therefore, in the present study, Ti 15Mo was alloyed with 0.8 wt.-% of the rare earth metals lanthanum (Ti-15Mo+0.8La) and neodymium (Ti-15Mo+0.8Nd) to improve its machinability. Their microstructure consisted of a titanium matrix and micrometer-size particles of the rare earth metals and two of their oxides. The particles stabilized the micro structure as grain growth was minimized. As especially the ductility might be affected by the precipitates, the behavior of Ti-15Mo+0.8La and Ti-15Mo+0.8Nd was investigated during static and dynamic deformation at elevated temperature to develop a processing route. The resulting mechanical properties (static strength and ductility) were similar in all investigated alloys.

Keywords : Ti 15Mo, titanium alloys, rare earth metals, free machining alloy
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