

Improving microstructure, hardness, corrosion resistance and wear properties of Ti-6Al-4V alloy by heat treatment

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ABSTRACT

Ti-6Al-4V is one of the most used titanium alloys. It is also of an increasing importance in engineering applications because of its excellent combination of high strength, low density, corrosion resistance and excellent bio-compatibility. But high wear of this alloy causes limitations for its use. Thus in present work we tried to improve the wear properties with improving the corrosion resistance. We studied the effect of immersion in biofluid i.e ringer solution for immersion time varying upto 240 Hrs. Then we have used the heat treatment process for modifying the microstructure and increasing the hardness of the alloy by solutionizing the alloy in the range of β transus temperature i.e 1050°C for 30min, then by varying the ageing time at the temperature range of 575°C . We have obtained various microstructure with varying values of hardness. The heat treatment cycle which is giving highest value of hardness along with that have given bimodal microstructure are tested for wear properties of alloy. The results thus obtained are correlated and compared to obtain the conclusion.

Keywords:- Ti-6Al-4V, Corrosion study, Heat treatment, Hardness, Optical Microscopy, SEM.