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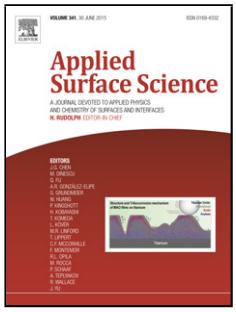

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Laser Surface Textured Titanium Alloy (Ti-6Al-4V)-Part 1 - Surface Characterization

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Abstract

In the present study, a detailed study of the characterization of laser-surface textured titanium alloy **(**Ti–6Al–4V) with line and dimple geometry developed by using an ArF excimer laser operating at a wavelength of 193 nm with a pulse length of 5 ns is undertaken. The characterization of the textured surface (both the top surface and cross section) is carried out by scanning electron microscopy, electron back scattered diffraction (EBSD) technique and X-ray diffraction techniques. There is refinement of microstructure along with presence of titanium oxides (rutile, anatase and few Ti_2O_3 phase) in the textured surface as compared to as-received one. The area fractions of linear texture and dimple texture measured by image analysis software are 45 % and 20 %, respectively. The wettability is increased after laser texturing. The total surface energy is decreased due to linear (29.6 mN/m) texturing and increased due to dimple (67.6 mN/m) texturing as compared to as-received Ti-6Al-4V (37 mN/m).The effect of polar component is more in influencing the surface energy of textured surface.

Key words: Laser surface texturing, microstructure, XRD, surface roughness, surface energy.

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