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Fe-C-Si ternary composite coating on CP-titanium and its tribological properties (Conference Paper)

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Abstract

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This study focused on the development of ternary composite coating through incorporation of Fe-C-Si ternary powder mixtures on CP-Ti substrate and characterizes the microstructure, hardness and wears behavior in presence of Jatropha oil. In this work, the surface of commercial purity titanium (CP-Ti) was modified using a tungsten inert gas (TIG) surface melting technique. The wear behavior of coated CP-titanium was performed using pin-on-disk machine. The results showed that the melt track has dendritic microstructure which was homogenously distributed throughout the melt pool. This Fe-C-Si ternary composite coating enhanced the surface hardness of CP-Ti significantly from 175 HV for the untreated substrate to ~800 HV for the Fe-C-Si coated CP-Ti due to the formation of intermetallic compounds.. The wear results showed that less wear volume loss was observed on the composite coated CP-Ti in presence of Jatropha-biodiesel compared to uncoated CP-Ti. The achievement of this hard Fe-C-Si composite coating on the surface of CP-Ti can broadened new prospect for many engineering applications that use biodiesel under different tribological variables. © Published under licence by IOP Publishing Ltd.

Indexed keywords

Engineering controlled terms: Aerospace engineering Biodiesel Composite coatings Hardness Inert gases Intermetallics Iron compounds Microstructure Silicon Titanium Tribology

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Commercial purity titanium

Dendritic microstructure

Engineering applications

Jatropha biodiesels

Surface hardness

Ternary composites

Tribological properties

Tungsten inert gas

Engineering main heading: Titanium metallography

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