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Laser coating of Ti-6Al-4V with SiC-based cermet

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The application of Ti-6Al-4V in the aerospace industry is justified by its weight savings capacity, space limitation advantage, corrosion resistance and composite compatibility. Despite these excellent bulk properties of Ti-6Al-4V alloy, poor surface properties has always limit its extensive applications in the aerospace industry. These poor properties can be enhanced by laser coating with SiC. However, SiC coating usually has poor adherence to the substrate and are prone to cracking mainly due to thermal stress. This work investigates the effects of adding Al and Ti powders to SiC laser deposited on Ti-6Al-4V. Microstructural characterization and phase analysis were carried out using SEM/EDS and XRD. Surface hardness was measured using Vickers hardness tester. The coatings of SiC-based cermets were crack-free as opposed to that of pure SiC. The XRD results show that SiC decomposed to produce Si, Si_2, SiC_2, and gaseous carbon which diffuses into the matrix. These contribute to significant increase in hardness from 254.5 $Hv_{0.3}$ in the native alloy to 1677.5 $Hv_{0.3}$ in the coated sample

Biography

D I Adebiyi is a Lecturer and researcher in new materials development. His research interests include laser surface engineering, cold spray coating and additive manufacturing. He is a receiver of an award for Innovation and Excellence in the use of stainless steel by the Southern African Stainless Steel Development Association. He has authored many publications and has chaired plenary section in international conference.

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