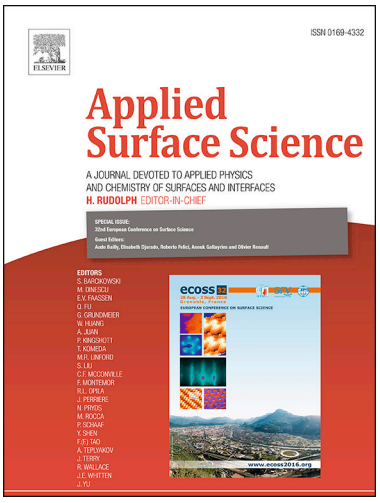

Full Length Article

Layered surface structure of gas-atomized high Nb-containing TiAl powder and its impact on laser energy absorption for selective laser melting

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Layered surface structure of gas-atomized high Nb-containing TiAl powder and its impact on laser energy absorption for selective laser melting

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Abstract: Ti45Al8Nb alloy (in at.%) is designed to be an important high-temperature material. However, its fabrication through laser-based additive manufacturing is difficult to achieve. We present here that a good understanding of the surface structure of raw material (i.e. Ti45Al8Nb powder) is important for optimizing its process by selective laser melting (SLM). Detailed X-ray photoelectron spectroscopy (XPS) depth profiling and transmission electron microscopy (TEM) analyses were conducted to determine the surface structure of Ti45Al8Nb powder. An envelope structure (~54.0 nm in thickness) was revealed for the powder, consisting of TiO_2 + Nb_2O_5 (as the outer surface layer)/Al_2O_3 + Nb_2O_5 (as the intermediate layer)/Al_2O_3 (as the inner

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