

Poster-Session

Tribo-functional DLC thin films deposited on additively manufactured steels and titanium-based alloys

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The combination of additive manufacturing (AM) and physical vapor deposition (PVD) of functional thin films offers a competitive approach for fabricating complex-shaped components and parts with enhanced surface properties. Among the various additive manufacturing (AM) technologies, laser powder bed fusion and metal binder jetting are well-established methods for producing metals, including steels and titanium-based alloys.

In initial investigations, the Institute of Materials Engineering at the TU Dortmund University demonstrated that diamond-like carbon (DLC) thin films exhibit comparable high adhesion on both AM and conventionally produced substrates. For AM substrates with open porosity, a growth model was developed to describe the coverage of open pores by the thin film based on the pore geometry. The DLC thin films effectively enhance the surface hardness and tribological properties of AM components and parts, thereby expanding their potential application field.