Surface Functionalization of Selective Laser Melted 17-4 PH by Plasma Polishing and Interstitial Diffusion Hardening for Thin Films

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Poster abstract

The powders used as feedstock in selective laser melting (SLM) process fundamentally limit the surface quality of these components. Particle contamination on the surfaces of the parts can remain rounded or agglomerated contributing to a very rough surface at the microscale. Furthermore, the manufacturing advantages of a closed component design lead to limitations in the mechanical finishing process, especially regarding undercuts and cavities. In addition to corrosion protection requirements, demands for wear resistance become increasingly important. This study deals with the development of a process chain for the surface functionalization of selective laser melted 17-4 PH by plasma polishing and interstitial diffusion hardening. In this context, both the leveling of the surface topography and the development of graded coating properties are of particular interest. In addition, this technology can be used to protect thin films against locally acting forces by providing sufficient support for the substrate materials.