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Investigation of TiAlN HiPIMS coating deposited on the newly developed Ni-based superalloy AD730Alekssei Obrosov¹, Muhammad Naveed¹, Ulrich Krupp², Mikhail Solovev², Sabine Weiß¹Brandenburg University of Technology, Cottbus, Germany ²University of Applied Sciences, Osnabrück, Germany

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The development of new alloys for gas turbine engines has been focused on withstanding against increasing service temperatures. AD730™ is a recently developed nickel-based superalloy for turbine disk applications with superior properties at 700°C, which is higher than the common service temperature for IN718. Use of coatings to enhance the properties of materials, such as wear resistance is widely known in various applications. This research presents an experimental study of TiAlN coatings, deposited onto AD730 superalloy using High Power Impulse Magnetron Sputtering (HiPIMS). Phase structure and chemical composition of the TiAlN films were characterized by X-ray diffractometry. Transmission electron microscopy as well as scanning electron microscopy were used to analyze the microstructure of the coating. Mechanical properties, including hardness, Young's modulus, and adhesion strength were measured using nanoindentation und scratch test.

Keywords

TiAlN coating

HiPIMS

Ni-based superalloy AD730

TEM

XRD