

## The Gradient Complex Protective Coatings for Single Crystal Nickel Alloys

**Authors :** Evgeniya Popova, Vladimir Lesnikov, Nikolay Popov

**Abstract :** High yield complex coatings have been designed for thermally stressed cooled HP turbine blades from single crystal alloys ZHS32-VI-VI and ZHS36 with crystallographic orientation [001]. These coatings provide long-term protection of single crystal blades during operation. The three-layer coatings were prepared as follows: the diffusion barrier layer formation on the alloy surface, the subsequent deposition of the condensed bilayer coatings consisting of an inner layer based on Ni-Cr-Al-Y systems and an outer layer based on the alloyed  $\beta$ -phase. The structure, phase composition of complex coatings and reaction zone interaction with the single-crystal alloys ZHS32-VI and ZHS36-VI were investigated using scanning electron microscope (SEM). The effect of complex protective coatings on the properties of heat-resistant nickel alloys was studied.

**Keywords :** single crystal nickel alloys, complex heat-resistant coatings, structure, phase composition, properties

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