

ELECTROCHEMICAL METHOD FOR APPLICATION OF Co-Mo AND Co-W SUPERALLOY COATINGS

Areas of Application

The cobalt superalloys with molybdenum and tungsten have many valuable properties for the advanced techniques and electronics, namely, high corrosion resistance, hardness, magnetic and catalytic properties, and wear resistance for the use in MEMS

Specification

The dense, fine-grained, X-ray amorphous coatings containing 13±25 at.% Mo and 20±24 at.% W are obtained from electrolytes by electrodeposition. The coatings obtained in standard corrosion environment have a high corrosion resistance (up to 8.5 kOhm for Co-Mo and 19 kOhm for Co-W).

The alloys have a higher electrocatalytic activity for hydrogen evolution reaction in alkaline media in comparison with pure cobalt.

In the case of Co-Mo alloys, a decrease in hydrogen evolution overvoltage comes to ~400 mV, while in the case of Co-W, it amounts to ~360 mV. The coatings show soft-magnetic properties: they have a low coercive force and reach a magnetization saturation in low-intensity fields

Advantages

The application of plating technology based on environment friendly citrate-pyrophosphate electrolyte enables to obtain high-quality functional coatings of Co-Mo and Co-W alloys and to control efficiently the plating process to produce the desired alloy composition and properties.

These alloys can replace electrolytic chromium coatings having a lower corrosion resistance

Stage of Development. Suggestions for Commercialization

IRL3, TRL3

The method is ready for developing customer requirement specification

IPR Protection

IPR2

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