



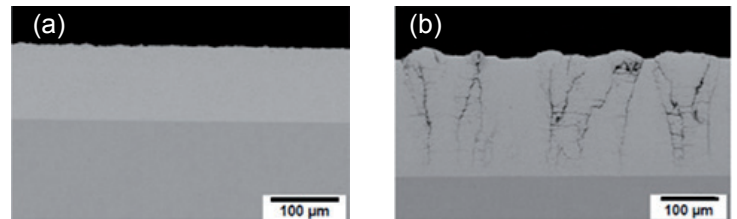
CONTROL THE MICROSTRUCTURE OF PLASMA SPRAYED COATINGS

Particulates filter device for plasma spray of liquid inputs (SPS or SPPS)

Technological benefits

Control of the microstructure of coatings

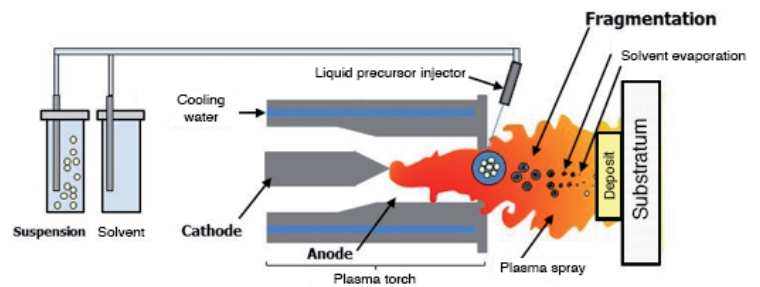
- Finely textured coating.
- Elimination of the untreated droplets.
- Better control of cracking in the deposit.
- Manufacturing of not cracked homogeneous nanometric microstructures.
- Nano- and micro structured deposits and wear resistant.



Examples of microstructures coatings obtained by SPS with (a) or without (b) selective filtering of droplets.

Invention overview

The present invention allows the control of the microstructure of the plasma sprayed coatings. It consists mainly of a selective filtering of the least energy droplets and a selective determination of system settings related to a specific microstructure.



SPS process

SPS processes (Suspension Plasma Spray) and SPPS (Solution Precursor Plasma Spray) consist in injecting a liquid solution respectively containing submicron particles or precursor salts, stored in a pressurized tank, in a plasma spray ($T > 10\,000\text{ °C}$) in the form of a liquid spray. After its fragmentation into droplets, and thermokinetics treatment with plasma flow, the deposit is built by successive stacking of liquid drops impacting the substrate. The liquid lamellae formed are cooled with rates of the order of 10^6 K/s to 10^8 K/s .

Potential applications

- Aerospace, medical, energy, harsh environments, mechanical (friction, wear, etc.).
- Realization of thermal barriers for propulsion.
- Manufacture of solid electrolytes for fuel cells.
- Creation of anti-wear and biomedical coatings.

Commercial benefits

Economical

- Limitation of wear coatings.
- Energy savings.

TRL : 3/4

Invention available under license.