



Post-doctoral position

Thermal spray process control by artificial intelligence

Place of work: German Aerospace Center, Stuttgart (Germany)

Contract: Fixed-term Contract of 24 months

Keywords: Process control, artificial intelligence, digital analysis, thermal spray, Nickel alloy, hydrogen

Description

The main objective of this research is to develop a system based on artificial intelligence (AI) to control plasma thermal spray process. This process was used to realize nickel alloy coating in the application of hydrogen production.

The coating obtained by thermal spray process presents some properties which derive directly from its structure and which are also indirectly coupled to the process parameters.

Indeed, the coating properties derive from the molten particle characteristics at impact onto substrate (momentum, viscosity, etc.); the molten particle characteristics at impact are derived from the thermodynamic characteristics of the plasma jet; the thermodynamic characteristics of the plasma jet result from the adjustment of the process parameters.

Thus, the origin of some phenomena involved in this process must be understood in order to understand their interaction with the jet and to know deeply their impact on the deposit.

Process control also requires the definition of robust strategy and rules in order to correct the process key parameters. To that end, the experimental protocols must be made reliable in order to know very precisely the conditions of their implementation and their criticality. The calculation protocols will have to be automated, in particular the processing of the databases necessary for the continuous learning of artificial intelligence.

Skills

Knowledge in cognitive sciences, implementation of protocol, statistical analyzes, scientific computing

Materials science, nickel alloy coatings, hydrogen production, catalyst

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