Suspension Plasma Spraying

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Résumé

Over the last decade, extensive research and development efforts have been dedicated to the emerging technology of suspension plasma spray (SPS). In this process, the feedstock material to be deposited consists of nano- or submicron-sized particles in suspension in a liquid (commonly ethanol or water). This suspension is injected in a plasma jet to produce coatings with unique microstructures, one or two orders of magnitude finer than those achieved normally in air plasma spray (APS). This emerging technology has attracted much attention over the last 20 years as it opens up a series of new research challenges as well as emerging industrial coating applications. In this presentation, an overview of the SPS technology will be provided with a focus on key challenges that must be addressed to improve our understanding and control of this innovative coating process. In particular, the injection of the suspension in the high speed thermal plasma jet and the trajectory of the impinging micron-size droplets close to the substrate at the stagnation point will be discussed. Finally a few examples of emerging applications of the SPS technology will be introduced.

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