

HISTORY OF THERMAL SPRAY AND ITS FUNDAMENTALS

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Thermal spray is a family of coating processes by which molten or semi-molten particles are deposited onto components to form relatively thick coatings in a range of hundred microns. Even though the technology has about 100 years of history since its invention and has established a very important position in industry, it is relatively unknown to the general public as well as academia. Materials science is expected to play more important role in this field. Fundamental processes such as heating and acceleration of powder particles in a plasma jet and flattening and solidification of molten droplet on a solid substrate are analyzed. Importance of wetting and solidification phenomena is stressed. Also, an in-situ method to monitor the coating growth by monitoring the substrate curvature is discussed and the mechanism of residual stress buildup in coatings is clarified.

Lecture co-financed by the European Union in scope of the European Social Fund