DEPOSITION AND REMELTING METHODS OF CORROSION AND WEAR RESISTANT COATINGS

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Abstract

The habilitation thesis entitled "Deposition and remelting methods of corrosion and wear resistant coatings" presents a synthesis of the main research results obtained by the candidate during the years 2005-2019 in the field of Materials Science and Engineering. The work approaches as the main direction of the research, the processing and characterization of the functional layers resistant to corrosion and wear by using modern techniques specific to surface engineering.

The thesis is structured in two parts and three distinct chapters, the first part being regarding the main scientific, professional and academic contributions, and the second part, presenting the evolution of the career and the perspectives of personal development. There are presented the main problems that arise in the components of the installations and equipment that work in the industrial field. During operation, they are subjected to corrosion and wear phenomena that can lead to their premature degradation. To improve the functional characteristics and increase the operating life of these components various deposition techniques (thermal spraying, laser cladding and weld deposition) and different categories of coatings are proposed.

It is highlighted the effect of surface irradiation with concentrated energy sources (laser, electron beam, WIG melting) on the microstructural and morphological characteristics of the thermally sprayed coatings. These materials, depending on the deposition process and the granulation of the depositing feedstock, have a non-homogeneous structure, with a certain degree of internal oxidation and porosity which can sometimes produce phenomena of spallation and delamination of the coating from the substrate. By using local treatments, the surface layer can be completely or partially remelted. In general, the purpose of applying these treatments is to improve surface characteristics by increasing wear, erosion and corrosion resistance.

In the last part of the habilitation thesis, the plans for the evolution and development of the professional career are presented.

The full thesis at:
http://www.upt.ro/img/files/2019-2020/doctorat/abilitare/UTU_Ion-Dragos/Rezumat_abilitare_Utu_Dragos_en.pdf

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