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In situ geothermal test results for multilayer coated steel

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Geothermal steam contains dissolved minerals that can precipitate from the liquid and deposit onto the surface of the blades and rotors used for turbine producing geothermal energy. This process is called scaling and it occurs due to a change in temperature, pressures or pH values of the geothermal fluid disturbing the equilibrium of the system. When scaling occurs in geothermal equipment can create major problems in geothermal power production. A solution to avoid these problems consists in coating the steel made turbine blade with different materials layer. These coatings will provide corrosion and erosion resistance and durability for the equipment used in geothermal energy. Samples coated with Ni base alloy and Y using high velocity oxygen fuel technique was investigated after in situ testing in Hellisheiði power plant in Iceland. This paper aims to investigate the microstructure, physical and chemical properties of the coating providing a view on the composite materials behavior under geothermal steam. The studied composite powders are designed to prevent corrosion damages and have good reliability during the geothermal turbines life. Powder multi-component and composite layers obtained were investigated using a system characterization by X-ray diffractometer and SEM and EDX analysis to obtain detailed information about the complex modifications inside of the structure and on interface deposition.

Biography

Ioana CSAKI, Associate professor, is working in Engineering and Management of Metallic Materials Production Department, Materials Science and Engineering, University Politehnica Bucharest, She published a series of 5 books, and over 45 articles and conference papers from which: 16 articles in ISI journals and proceedings and 32 articles in journals indexed in international data base. She was project partner for 3 international research grants, 1 being the project manager on behalf of UPB and participation at over 48 research national grants. She is also project manager for EEA grants collaboration between University Polytechnic Bucharest and University of Iceland. The research directions approached were metallic powders processing for new multi-component materials through powder metallurgy advanced materials, composite materials, high entropy alloys with very good mechanical properties and multi-component materials for coating parts submitted to high corrosion environment and high wear.

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