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Surface alloying of Al coatings on P92 steels by laser line scanning

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Conventional protective coatings for energetic applications (*e.g.* heat exchangers, certain turbine components) are highly exposed to severe degradation conditions. High steam pressure and temperature, typical of high performance operating regimes have a dramatic effect over the materials' long-term lifespan. Within this context, further expansion of conventional materials performance is of utmost importance, especially when revamping of existing facilities is in sight. Herein, we present a recently developed laser line scanning method for surface alloying treatments, based on directional solidification of an intermetallic coating, particularly adapted for the Al/P92 steel system studied. Such conventional material system has been widely reported in the literature using different preparative approaches. Much less common has been the work on laser treatments, particularly on directional solidification. Such directionality is partially achieved by processing samples at traverse rates with values ranging between 30 and 300 mm/h. Undesirable effects associated to aluminium oxide formation are reduced by using a controlled atmosphere chamber during laser surface alloying. This advanced laser line scanning method offers the means to effectively control the microstructure, surface and adherence properties of Al/P92 protective coatings.

Biography

Hector Santos finished his Master's in Chemical Engineering in 2007 and has since been working at the Surface Engineering and Nano-structured Materials Research Group of the Complutense University of Madrid. He is currently starting 4th year of his PhD studies.

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