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Diagnostics of laser remelting of thermally sprayed coatings using an infrared camera

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Laser remelting of thermally sprayed coatings is a promising possibility how to improve their functional properties such as wear and corrosion resistance. To achieve the optimal results and the desired depth of remelting, it requires a precise control of laser process parameters. However, any suitable control of laser remelting process by means of infrared measurement was yet not described. In this study, a high-power diode laser was used to remelt the HVOF sprayed stellite coatings. Samples with a different coating/substrate thickness ratio were utilized and by variating the process speed the different depth of remelting was achieved. The remelting process was recorded by the combination of a Long Wavelength Infrared (LWIR) and a Near Infrared (NIR) camera. The experiment was designed to find the most suitable method for diagnostics of a remelting process. The possibilities of evaluation of a temperature field in the interaction zone are presented. The width of melting pool is calculated from the evaluated temperatures and then correlated with the measured depth of remelting. The approximations of their mutual dependence show very high correspondence. It indicates that this measurement can be used for controlling of the depth of remelting, regardless of the samples dimensions.

Biography

Marek Vostřák is a PhD candidate in the field of Laser Technologies. In 2010, he has received his Master's degree in Applied Physics from the University of West Bohemia and he has been a Researcher in the New Technologies Research Centre since then. His research is focused on laser cladding and laser remelting and utilization of thermography measurement in these technologies. He is an author and co-author of numerous outcomes of applied research and some notable publications in this area, the most recent one is "Diagnostic of laser remelting of high velocity oxygen fuel sprayed stellite coatings using an infrared camera published in *Surface and Coatings Technology* volume 318 (2017): 360–364.

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