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# Investigation of sprayed particle filling qualities within the texture on the bonding behavior of Ni-based coating

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**Abstract:** ASTM1045 steel was used as substrate that was laser processed with surface texturing. Ni-based coatings were deposited on the substrates using the atmosphere plasma spray technology. Surfaces with different dimple diameter and depth were acquired by adjusting the processing parameters and their effect on the bonding behavior between coatings and substrates were investigated. Scanning electron microscopy was used to characterize the cross section morphology of sprayed coatings, investigating the filling quality of coatings in the dimples. The image analysis method was also applied to calculate the contact area ratio resulting from texturing, evaluating the energy release rate at the surface/interface. XRD diffraction and nanoindentation tests were used to measure the residual stress of substrates after laser treatment and coatings near interface, respectively. The calculation analysis was carried out to research the relationship between the coating filling quality and the texturing parameters. The adhesion strength of coatings was evaluated through tensile tests. The results showed that the bond strength values present an initial increase followed by a decrease when the state of the coatings goes from full filling state to air

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