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The Effect of Substrate Surface Roughness for Hot Dip Aluminizing of IN718 Alloy

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Abstract : The hot dip aluminizing (HDA) process involves immersing a metallic substrate into a molten aluminum bath for several minutes, and removed from the bath and cooled down to room temperature. After the HDA process, various aluminide layers are formed as a result of interdiffusion between the substrate and the molten aluminum and between the aluminide layers. In order to form a uniform aluminide layer, the specimen must be covered and wet well by the molten aluminum. Surface roughness plays an important role in wettability, and thus, surface preparation is an important stage in determining the final surface roughness. In this study, different roughness values were achieved by grinding the surface with emery papers as 180, 320 and 600 grids. After the surface preparation, the HDA process was performed in a molten Al-Si bath at 700 ^{O}C for 10 minutes. After the HDA process, a microstructural examination of the coating was carried out to evaluate the uniformity of the coating and adhesion between the substrate and the coating. According to the results, the best adhesion at the interface was observed on the specimen, which was prepared by 320 grid emery paper having a mean surface roughness (Ra) of 0.097 µm.

Keywords : hot-dip aluminizing, microstructure, surface roughness, coating
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