

Metallic Coating for Carbon Fiber Reinforced Polymer Matrix Composite Substrate

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Abstract: This paper investigates the application of metallic coatings on high fiber volume fraction polymer matrix composites. For the grip of the metallic layer, a method of modifying the surface of the composite by introducing a mixture of copper and steel powder filler powders which can reduce the impact of thermal spray particles. The powder was introduced to the surface at the time of the forming. Arc spray was used to project the zinc coating layer. The substrate was grit blasted to avoid poor adherence. The porosity, microstructure, and morphology of layers are characterized by optical microscopy, SEM and image analysis. The samples were studied also in terms of hardness and erosion resistance. This investigation did not reveal any visible evidence damage to the substrates. The hardness of zinc layer was about 25.94 MPa and the porosity was around 6.70 percent. The erosion test showed that the zinc coating improves the resistance to erosion. Based on the results obtained, we can conclude that thermal spraying allows the production of protective coating on PMC. Zinc coating has been identified as a compatible material with the substrate. The filler powders layer protects the substrate from the impact of hot particles and allows avoiding the rupture of brittle carbon fibers.

Keywords : Arc spray, coating, composite, erosion