

Influence of surface preparation on the fracture behavior of acrylic adhesive/CFRP composite joints

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Abstract-

The surface modification and adhesive bonding of a carbon fiber reinforced plastic (CFRP) composite has been investigated. Wettability studies showed that plasma-treated specimens provide a significant increment in the surface energy, relative to untreated material. The surface modification resulted in significantly improved adhesion between the composite and an applied toughened acrylic adhesive; a considerable increase in fracture energy was observed following grit blasting and grit blasting plus silane treatments. Specimens treated with atmospheric plasma showed a slight increment in fracture energy, usually failing adhesively. The durability was tested using a wedge test. Specimens degreased and treated with atmospheric plasma showed the greatest crack growth and failed in an adhesive mode.

Index Terms- Acrylic adhesive, CFRP/epoxy composite, Fracture mechanics, Surface modification, Wettability

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