



#PLATH00142

SURF / Plasma - surface interactions

Effect of plasma sources on the surface modification of carbon reinforced epoxy by atmospheric pressure plasma treatment

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Abstract content

The bonding and adhesion properties of polymer composites is an important consideration in manufacturing processes. A key challenge in polymer adhesion is the need for adhesive pretreatment to improve the wettability properties of the surface. Often three sequential steps are needed: contaminant removal, physically induced surface modification and chemical treatment. Atmospheric plasma treatment (APT) has been shown to either achieve, or eliminate the need for, one or more of these steps[1,2]. The effects of APT on the surface properties of thermoplastics and thermosetting polymers have been reported recently[3], but the report on the effect of different plasma sources on the APT of polymers has been limited. This report presents a study of the effect of dielectric barrier discharge (DBD) plasma sources on the surface modification of Carbon reinforced epoxy. 50% carbon fibre epoxy samples were subjected to either microwave or dielectric barrier discharge (DBD) plasma sources with either argon, nitrogen or oxygen under atmospheric conditions. The surface energy of the polymers and composites were determined using liquid contact angle analysis. Fourier transform infrared spectroscopy (FTIR), X-ray photoelectron spectroscopy (XPS) and coherent probe scanning interferometer techniques were used to characterise the surface changes. The underlying mechanisms for the observed change of surface properties will be discussed.

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References

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