A Study of Anodization on Mechanical Interfacial Adhesion of Carbon Fibers/Epoxy Matrix Composites

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In this study, the influence of anodic oxidation was investigated on the mechanical interfacial adhesion properties of carbon fibers-reinforced epoxy matrix composites. Surface characteristics of carbon fibers before and after treatments were investigated by contact angles, SEM, XPS, and FT-IR. The mechanical interfacial properties of the composites were investigated in terms of inter-laminar shear strength (ILSS), critical stress intensity factor (KIC) measurements. As experimental results, the XPS spectra showed that the oxygen/carbon ratio and quantity of oxygen functional groups were enhanced efficiently by the anodic oxidation. The ILSS of composites was increased, due to the improvement of interfacial adhesion between fibers and matrix resin. These results could be explained that the surface free energy, amount of containing-oxygen functional groups, and wetting ability were all found to increase significantly after anodization.