



## Protective Waterborne Coating Based on G/CNT Hybrid Filler

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The focus of this research work was to evaluate the potential of G/CNT based polymer composites to be used as protective coatings for outdoor application. In order to perform that, graphene/carbon nanotubes (G/CNT) based polymer composite was synthesized via miniemulsion polymerization. The weight ratio of G and CNT was 10:1, while the concentration of the G/CNT hybrid filler with respect to the monomers was 1 wt.%. The polymer composite was subjected to UV irradiation at accelerated aging conditions for 400 hours. The chemical and morphological changes were followed using Infrared spectroscopy with Fourier transformation and Scanning electron microscopy. The obtained results suggested that the composite filled with G/CNT hybrid did not suffer significant chemical or morphological changes after 400 h UV irradiation. After the irradiation, minor changes of the water contact angle and surface energy were observed in the case of the G/CNT/polymer composite. The water uptake of the composite was examined by immersion of the free-standing film in distilled water at ambient conditions. The mass change of the composite and the neat polymer was followed. After 300 hours of immersion the composite presented approximately 60% reduced water uptake compared to the neat polymer. The obtained results are demonstrating that G/CNT/polymer composite is promising material for application as protective coating for outdoor use.

**Keywords:** coatings, G/CNT hybrid, UV degradation, waterborne composites