

Graphene based coatings for UV radiation shielding: an improved way of protection!!

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Abstract (Arial 10)

UV radiation has short wavelength and high energy exposure. Even though UV radiation is widely used in industrial processes and applications like detectors, sensors, medical diagnosis and therapy, prolonged exposure to it may result in degradation and harmful health effects on the skin, eyes, and immune system of humans. Protection is therefore needed and alternative UV shielding materials with enhanced performance and versatility are still required [1].

In this paper, graphene oxide and few layer graphene based nanocomposite and coatings of poly (vinyl alcohol) and textiles of polyester (PY) were tested for shielding of UVC (100–280 nm), UVB (280–315 nm) and UVA (315–400 nm) radiation. The nanocomposites were characterized by scanning electron microscopy, thermogravimetric analysis, Raman spectroscopy and infrared spectroscopy. Results show no significant structural changes after radiation, indicating a good stability of the studied systems. The incorporation of graphenic nanostructures resulted in transparent films and textiles (Fig.1) with enhanced UV-shielding properties. The results are promising and the absorbance of ultraviolet light at 300 nm can be up to 80% for films with around 70% of transparency in visible spectral range and concentration as low as 0.5 wt% of nanocarbon.

References

[1] Yasuhiro Matsumura and Honnavara N. Ananthaswamy, Toxicology and Applied Pharmacology, 3 (2004) Pages 298–308.

Figures



Figure 1 – Photographs of graphene containing coating and textile for UV radiation shielding.