

Mechanical behaviour of graphene reinforced polypropylene composites

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Abstract

Polypropylene (PP), as one of the most important thermoplastics in the world, has been widespread used in plastic packing, plastic parts for machinery and equipment, plastic furniture and even fibres and textiles [1]. However, many innovate materials require enhanced strength as well as multifunctional properties. In this sense, the utilisation of graphene opens a new perspective for polymer nanocomposites, revealing extensive research and development in the last two decades. Besides, adding graphene as a reinforcing agent in polymer matrices has improved the overall performance and properties of such composites, revealing promising applications in wide range of fields such as, electronics, biomedical aids, membranes, mechanical structures, among others [2]. This work reports some advancements and challenges of graphene reinforced polypropylene composites related to their mechanical properties, such as tensile strength, elastic modulus, and impact resistance. Also, scanning electron microscopy (SEM) and RAMAN hyperspectral maps are analysed to give a glimpse of the dispersion of the particles. The RAMAN and SEM images were then used to explain the observed mechanical behaviour of graphene-based composites.

References

- [1] Maddah; H.A, American Journal of Polymer Science, 6 (2016) 1-11.
- [2] Mohan; V.B et. al, Composite part B, 142 (2018) 200-220.

Figures

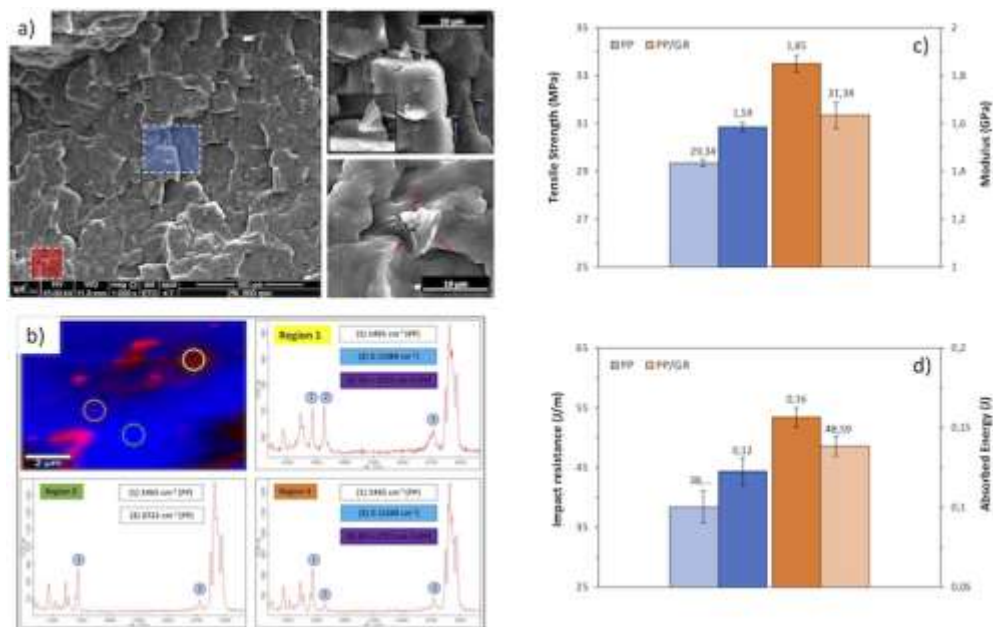


Figure 1: (a) SEM; (b) RAMAN spectroscopy; (c) Tensile strength and elastic modulus, and (d) Impact resistance and absorbed energy of graphene reinforced polypropylene composites.