

Development of carbon nanotubes/polypropylene nanocomposites with ESD and fire retardancy properties for and innovative sandwich panel

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Abstract (Arial 10)

Composite sandwich panels are versatile materials used in lightweight structures for building sector. Different properties are required in the final application such as a high strength, flexural rigidity and a suitable insulation. Other important technological qualities to take into account in this field are the electrostatic discharge (ESD) and fire retardancy. In several building areas, where is possible to find electronic equipments or similar devices, it is important to discharge the electrostatic charge to avoid sparks or failures in systems¹ and to protect the surface against flame.

In this regard, carbon nanostructures are a suitable candidate to achieve these requirements² due to their intrinsically electrical properties^{3,4}. Moreover, combined with other nanostructured materials, fire performance properties can also be improved.

In the present study, an innovative polypropylene nanocomposite sheets have been developed via *one-step* extrusion process combining synergistic effects of different nanoparticles. Rheological and optical microscopy results showed an optimal dispersion of nanofiller in polymer matrix. Furthermore, mechanical properties have been enhanced by means of this development. Finally, antistatic and fire retardancy properties were achieved at low content of well dispersed carbon nanotubes combining with an intumescent nanomaterial coating.

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References

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Figures

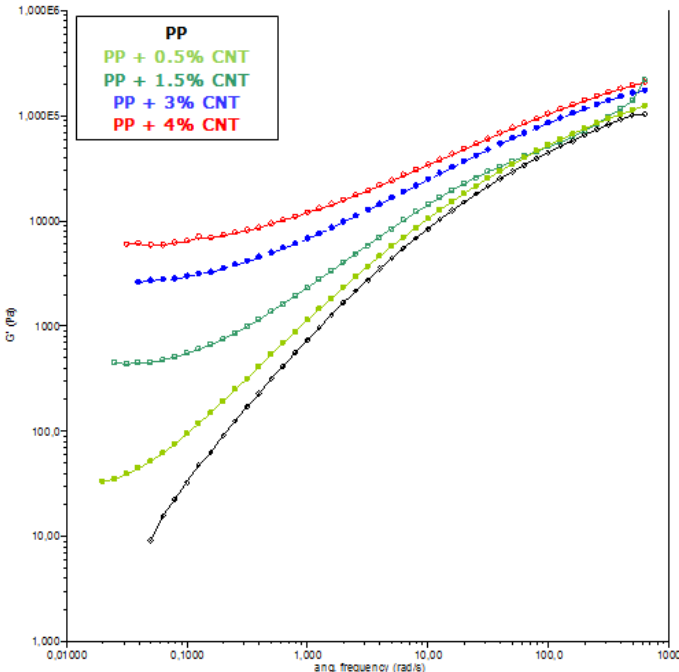


Figure 1. Rheological oscillatory analysis of neat polypropylene and nanocarbon composites.



Figure 2. Flammability test for sandwich panels.