

Eco-design and recycling of conductive multilayer polymer composites for EMI Shielding

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Résumé :

In this work, flexible films containing conductive and/or magnetic fillers fabricated via forced assembly co-extrusion were investigated as support for Plastronic devices. The challenge is to obtain a high-efficiency 3D electrical/magnetic filler network with an ordered distribution. Comprehensive characterization of these materials provides valuable insights into the relationships between processing conditions, shear and elongation rheological behavior, material structure, and performance. The potential of combining different types of fillers and polymers is explored to develop multifunctional composites with tailored properties for specific applications. Hence, this work focuses first on optimizing the dispersion and/or distribution of high aspect ratio nanofillers within the LLDPE, HDPE and LDPE polymer matrices with different Short and Long Chain Branching (SCB and LCB) to well understand their effects on both Strain Hardening and the composites' EMI shielding properties. Furthermore, environmental impact and recyclability of the obtained materials were investigated and the results are ensuring that the developed composites are not only effective but also sustainable.