POLYMERIC COMPOSITE WITH ELECTROMAGNETIC PROPERTIES

National Institute for Aerospace Technology, in collaboration with CSIC and KIT, has developed nanostructured composite materials with combined electromagnetic, mechanical, and thermal properties that outperform current state-of-the-art solutions.

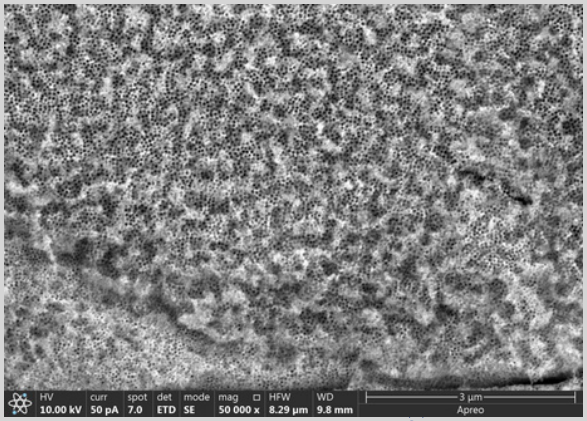
The present technology offers the possibility of combining metal oxide nanostructures within thermoplastic polymer matrices, with the capability to precisely position the nanostructures within the matrix. In this way, it is possible to tune electromagnetic reflection, absorption, and transmission parameters, as well as thermal conductivity, while preserving the mechanical properties virtually unchanged. The technique also allows the combination of different polymers or the incorporation of additives such as metallic nanoparticles, further enhancing the tunability of material properties.

The manufacturing method avoids the use of harmful solvents, the chemical composition of the employed nanostructures is non-toxic, and it enables the use of recycled plastics, with the potential to be processed as feedstock material in filaments intended for additive manufacturing.

The potential applications of this type of material span the entire radiofrequency spectrum, from telecommunications and electronics to medicine:

- In the field of electronics: shielding of various components, development of highly sensitive electromagnetic sensors, advanced energy storage devices with improved thermal dissipation capability, and lightweight and efficient electromagnetic shielding materials to protect sensitive equipment from interference.
- In biomedicine: prostheses or implants with tunable mechanical properties, magnetic resonance-compatible devices, and advanced sensors.

Multifunctional material with tunable electromagnetic, mechanical, and thermal properties

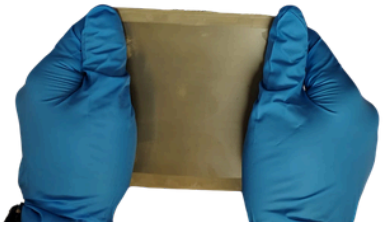


MARKET NEED

- Reduction of electromagnetic interference.
- Adaptability and reconfigurability of properties according to usage requirements or operating environment.
- Enhanced efficiency and miniaturization.

ADVANTAGES

- Tailorable electromagnetic, mechanical, and thermal properties.
- Significant cost reduction compared to existing materials.
- Micrometer-scale thickness, compared to the current millimeter scale.
- Scalable according to specific requirements.
- Compatibility with additive manufacturing (3D printing).
- Enables large-scale production and precise molding due to the properties of the thermoplastic matrix.



STAGE OF DEVELOPMENT

- Technology protected by a patent application.
- Open to technology transfer across different fields and to collaboration for the evaluation of specific applications.

CONTACT

Knowledge Transfer Office

otc@inta.es
91 520 11 53
www.inta.es