

Rigid polymer foams with good electrical conductivity

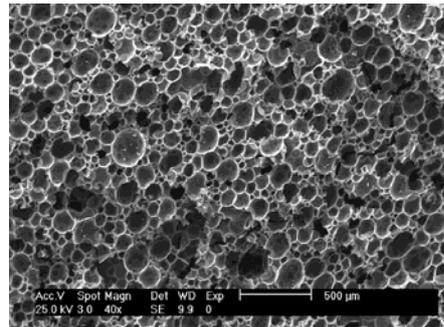
The Spanish National Research Council (CSIC) has developed polymeric foams based on epoxy resin filled with nanostructured carbon materials. These foams exhibit higher conductivities and permittivities than conventional foams. Due to their excellent electrical properties, they are suitable for electromagnetic shielding or electrostatic discharge prevention. Besides, due to their low density they are suitable for application in the transport sector showing enhanced compatibility with the materials of panels formed by sandwich structures.

An industrial partner for a license agreement is sought

A lightweight alternative to metal materials

The current solutions as electromagnetic shielding systems in the transport sector comprise the use of heavy metallic materials or meshes such as aluminum or nickel. However, weight-reduction is a much sought-after characteristic to reduce fuel-consumption of vehicles. The foams developed by scientific researchers of CSIC provide an attractive solution since, besides of their low densities, they exhibit optimal conductivities in semiconductor range being six magnitude orders higher than conventional unfilled foams.

These foams consist in an epoxy matrix where carbon nanomaterials such as CNT or graphenes have been dispersed. Processing is carried out by processing techniques commonly used in plastic industry. The final product is a cellular material with closed cell structure where the fillers are homogeneously dispersed forming a percolated network that plays an important role in the electric behaviour of the foam.



SEM image of foam

Main applications and advantages

- **Industrial feasibility:** the preparation of the foam is simple and is carried out by processes commonly used in the plastic industry.
- **Costs reduction:** these foams exhibit high conductivities even at low filler content. Besides, as light materials, they provide fuel savings when used in transport applications, in particular in the aeronautic sector.
- **Applications:** They are suitable to prevent electric discharges and for electromagnetic shielding in packaging and encapsulation of electronic components. These foams are suitable to produce the panels formed by sandwich structures commonly used in the transport area since they exhibit larger compatibility than currently used polyurethane foams. In addition, they enable good painting and finishing.

Patent Status

Spanish patent filed with possible international extension.

For further information, please contact

Patricia Thomas V, Ph.D.
Material Science Area
Deputy Vice-Presidency for Knowledge Transfer
Spanish National Research Council (CSIC)
Tel.: + 34 – 91 561 34 41
Fax: + 34 – 91 564 48 53
E-mail: patricia.thomas@ictp.csic.es