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Modelling of dispersion quality of carbon nanotubes in thermosetting blends for capacitive behaviour enhancement of composite materials

ABSTRACT. The dispersion of multiwalled carbon nanotubes (MWCNT) in an epoxy matrix of thermosetting systems is studied with microdielectrometry via embedding dielectric sensors. The dielectric response of the liquid system is analysed with complex nonlinear least squares fitting of the frequency dependence of impedance. A suitable equivalent circuit is employed where the circuit elements represent physical properties of the mixture, such as the viscosity through ionic mobility, dipolar relaxation and the inductive behaviour of nanoreinforcement agglomerates. This last property proves to be a quality index of the MWCNT dispersion. Successful dispersion is a prerequisite for the development of supercapacitor assemblies as energy storage devices.

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