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Federica Zaccardi, M. Gabriella Santonicola, Susanna Laurenzi

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# Quantitative assessment of nanofiller dispersion based on grayscale image analysis: A case study on epoxy/carbon nanocomposites

Federica Zaccardi[a], M. Gabriella Santonicola[b], Susanna Laurenzi[a,*]

[a]*Department of Astronautical Electrical and Energy Engineering, Sapienza University of Rome, Via Salaria 851-881, 00138 Rome, Italy*

[b]*Department of Chemical Materials and Environmental Engineering, Sapienza University of Rome, Via del Castro Laurenziano 7, 00161 Rome, Italy*

*Corresponding author. E-mail address: susanna.laurenzi@uniroma1.it (S. Laurenzi).

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**Abstract**

Filler dispersion in polymer matrices plays an important role in defining the performance of nanocomposite materials. Here, a novel method for the quantitative assessment of filler dispersion is reported. The method is based on the direct analysis of optical images using an algorithm implemented in MATLAB, which considers the distance of each pixel with respect to pixels of same value and to pixels of different value. A dispersion index is determined by comparing the grayscale optical image with the corresponding uniformly dispersed image. The algorithm was used to study the dispersion state of samples containing different types of graphene nanoplatelets dispersed in Prime 20 LV epoxy at different concentrations and sonication times. Image analysis via the proposed algorithm resulted to be coherent with the qualitative assessment which can be inferred from visual inspection, that is the dispersion degree becomes worse at increasing loading and improves when increasing the sonication time.

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