

Abstract Submitted
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Thermal properties of composite materials: a complex systems approximation¹ J. L. CARRILLO, BEATRIZ BONILLA, J. J. REYES, Instituto de Física BUAP, VICTOR DOSSETTI, CIDS- BUAP — We propose an effective media approximation to describe the thermal diffusivity of composite samples made of polyester resin and magnetite inclusions. By means of photoacoustic spectroscopy, the thermal diffusivity of the samples were experimentally measured. The volume fraction of the inclusions was systematically varied in order to study the changes in the effective thermal diffusivity of the composites. For some samples, a static magnetic field was applied during the polymerization process, resulting in anisotropic inclusion distributions. Our results show a significant difference in the thermal properties of the anisotropic samples, compared to the isotropic randomly distributed. We correlate some measures of the complexity of the inclusion structure with the observed thermal response through a multifractal analysis. In this way, we are able to describe, and at some extent predict, the behavior of the thermal diffusivity in terms of the lacunarity and other measures of the complexity of these samples [1]. [1] F. Cervantes-Alvarez, J J Reyes-Salgado, V Dossetti, and J L Carrillo, J. Phys. D: Appl. Phys. 47 (2014) 235303; J. J. Reyes-Salgado, B. Bonilla, V. Dossetti, and J L Carrillo, J. Phys. D: Appl. Phys. 48, (2015)

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