António Ribeiro, Nano Res Appl 2018, Volume 4
DOI: 10.21767/2471-9838-C5-020

26th International Conference on **Advanced Nanotechnology**
&
2nd Edition of International Conference on
Materials Technology and Manufacturing Innovations
October 04-05, 2018 Moscow, Russia

António Ribeiro

Universidade de Lisboa, Portugal

Electrical properties of conductive polymers under stress

Statement of the Problem: With the growing field of application of composites as replacements for hitherto metallic applications, the need for conductive polymers has increased. In fact, although composites can often replace metals with gains in weight, some applications require electrical conductive properties. Metallic films and grids have been envisaged and sometimes applied, but the high density of metals still imposes a significant increase in weight. The use of electrically conductive polymers might provide an interesting solution, but there is scarce information about the electrical behavior of such polymers when included in structural members. Additive manufacturing is a technology that enables the construction of graded materials. The specimens where built with layers in conductive PLA and regular PLA. The purpose of this study is to describe the tests and results obtained while measuring the electrical conductivity of polymers under stress.

Methodology & Theoretical Orientation: Electrical resistance of specimens was measured under different load conditions. The specimens were obtained by fusion deposition modeling; since this process delivers non-isotropic parts, the influence of manufacture process parameters was also tested. Specimens were tested for uniaxial and bending behavior.

Findings: A database of values of the electrical conductivity of the studied polymers was obtained and the influence of the manufacture parameters on this property was studied.

Recent Publications

1. Leigh Simon J, et al. (2012) A simple, low-cost conductive composite material for 3D printing of electronic sensors. PLOS One 7(11):e49365.
2. Espalin David, et al. (2014) 3D Printing multi-functionality: structures with electronics. International Journal of Advanced Manufacturing Technology 72(5-8):963-978.
3. Czyżewski J, et al. (2009) Rapid prototyping of electrically conductive components using 3D printing technology. Journal of Materials Processing Technology 209(12-13):5281-5285.
4. Panda Biranchi Narayan, et al. (2017) A CAD-based approach for measuring volumetric error in layered manufacturing. Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science. 231(13):2398-2406.
5. Panda Biranchi, et al. (2018) Experimental and numerical modelling of mechanical properties of 3D printed honeycomb structures. Measurement. 116:495-506.

Biography

Antonio Ribeiro is an Assistant Professor in the Mechanical Engineering Department at the Instituto Superior Tecnico, lecturing several courses in the Mechanical Design and Structural Materials Scientific Area. He has completed his PhD in Mechanical Vibrations at the University of Lisbon. His main studies are focused "On holistic approaches to engineering design and additive manufacturing".

relogio.ribeiro@tecnico.ulisboa.pt