



BOOK OF ABSTRACTS

MATERIALS 2013

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# Materials 2013

Coimbra, Portugal  
March 25 – 27

## Book of Abstracts

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## Properties and processing by extrusion of electrically conductive multilayer filaments comprising polymer composites

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This work describes the production and characterization of three-layer piezoelectric filaments using two different electrically conductive polymers. The filaments were produced in a filament extrusion line, equipped with a coextrusion die that enabled a coaxial arrangement for a three-layer filament. For the inner and outer layers two different electrically conductive compounds were used, and the middle layer was made of the electroactive polymer PVDF. The produced filament can be used as a piezoelectric sensor, as described in other work [1].

A commercial conductive polymer grade of polypropylene compounded with carbon black and a commercial polypropylene containing 7 wt% of carbon nanotubes were studied and compared when employed as the filament conductive layers under various processing conditions, namely different process temperatures and drawing ratio. For evaluation purposes measurements of the electrical resistance of the inner and outer conductive layers were performed and correlated with the composition and processing conditions.

The polypropylene based composite containing 7 wt% carbon nanotubes revealed to be the most effective material to be used in the production of three-layer piezoelectric filaments since it presents higher electrical conductivity and easier processing, allowing the production of more flexible filaments.

**Acknowledgements:** The authors thank the Portuguese Foundation for Science and Technology (FCT) for financial support under PDTC (PTDC/CTM/108801/2008) and the Compete program, FCOMP-01-0124-FEDER-009480.