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# Study of the electromechanical behaviour of Ti-Ag coated polymers for biomedical applications

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Recent investigations in biosensors showed the advantages in the use of polymeric substrates, coated with conductive and biocompatible thin films such as Ti as bio-interfaces, in order to functionalize the electrode surface for the bio-signal acquisition. Furthermore, Ag is widely known for its ductility and excellent electrical behavior. In addition, the bactericide effect of Ag allied to Ti biocompatibility, have shown very interesting biological, electrical and mechanical properties linked to the particular structure developed by the formation of the Ti-Ag intermetallic phases. TiAgx thin films, with different amounts of Ag, were prepared by magnetron sputtering, using a titanium target with Ag pellets placed on its erosion zone. Intermetallic Ti-Ag thin films were used to coat polyethylene terephthalate (PET) and polypropylene (PP) substrates. The influence of the polymer-base on the overall response of the thin film sensor devices was studied and correlated with the main physicochemical characteristics of the different films.
The electromechanical behavior of the coated polymers was evaluated under uniaxial stretching. During the tests, the elastic response of the system: polymer + thin film of TiAgx was assessed at the same time that electrical resistance values for deformations up to 10% were recorded. Throughout the stretching tests, a semi-quantitative evaluation of the films adhesion on the polymeric substrate was performed based on optical images acquired by a digital optic microscope, where the occurrence of cracks was correlated with the tensile strength and the electrical resistivity. Complementary information was obtained by SEM micrographs performed in situ during an uniaxial stretching in polyethylene terephthalate (PET) with a specific bone shape designed for this kind of experiments.

**Keywords**
Thin films
TiAg
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