

## **Coatings on complex substrates – protection of cork and rubber relatively to mechanical wear and from UVA and UVC radiation**

B. Tiss<sup>1</sup>, C. Mansilla<sup>2</sup>, D. Martínez<sup>1</sup>, L. Cunha<sup>1</sup>

<sup>1</sup> *Physics Center of Minho and Porto Universities -CF-UM-UP, Campus de Gualtar, 4710-*

*057 Braga, Portugal; <sup>2</sup> CTECHnano Coatings Technologies S.L., Tolosa Hiribidea 76, 20018, San Sebastián, Spain*

[belgacem.tiss91@fisica.uminho.pt](mailto:belgacem.tiss91@fisica.uminho.pt) / [sofian.tis15@gmail.com](mailto:sofian.tis15@gmail.com)

The performance enhancement of a material with maintenance the useful bulk characteristics is generally achieved by modification of the surface by deposition of a thin film. However, when in presence of a sensitive and/or complex substrate, this task is less obvious. Cork and rubber, for instance, are natural products with polymeric organic nature and they are found in many applications. Exposed to sunlight or in situations of friction and/or mechanical wear, they reveal aging by decolouration, scratches, or even craters. To protect these materials against these aggressive conditions, a logical solution would be to coat them with an adequate thin film, without losing the characteristics of the base materials. But both materials are difficult to coat. Besides temperature sensitivity, they show great deformation capability, which forces the deposited coating to be flexible and adherent. In addition, they show high roughness, and the polishing is very challenging, or even impossible. There are successful results reported on films deposited on rubber, but literature related to deposition of coatings on cork is absent. In this work, we report the depositions of thin films on the referred complex substrates by magnetron sputtering and atomic layer deposition on plates and particles, respectively. Results of the structural characteristics, optical measurements of the coatings and ageing tests on the coated cork and rubber will be presented as well.