

Footwear materials with enhanced comfort properties based on functional nanoparticles

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Presently, consumers' expectations and needs require that footwear integrates fashion, emotional desires and real multifunctional performances. To meet these challenges and keep competitive, the European footwear and allied trade companies put their efforts in the creation of advanced products exploring the remarkable properties of nanoengineered materials.

1. *Leathers with antimicrobial and antifungal properties.* In footwear the control of bacteria and fungus growth is important to prevent and minimize the generation of malodours and some foot skin problems. This route was studied by CTCP and FCUP preparing stable Ag, ZnO, CuO, Cu nanoparticles (NPs) that were able to induce antibacterial activity on leather surface [1].

2. *Polymeric materials with enhanced thermal and electrical properties.* In this study, thermal and electrical conductive NPs, including carbon based NPs, metallic-based NPs and organic antistatic additives, were considered and processed [2]. The nanocomposites developed were evaluated by standard methods EN 13521 and EN ISO 20344.

3. These developments are supported by the definition of new methodologies to assess the effective environmental burden due to NPs application.



Fig.1 Antimicrobial activity of leather modified with Ag NPs.

References

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2. Elena Orgilés Calpena, F. Arán-Ais, A. M. Torró-Palau, C. Orgilés-Barceló. “Chemical functionalization and dispersion of carbon nanofibers in waterborne polyurethanes adhesives”. J. of Adhesion, 89(3) 174-191, 2013.

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