Multifunctional nanocoating: hydrophobic and wear resistant properties

Ángel Yedra
Noelia Vilar, Marina González and Carmen Manteca

Advanced Materials and Nanomaterials Unit, Fundación Centro Tecnológico de Componentes (CTC), Santander 39011, Spain

ayedra@centrotecnologicoctc.com

Usually hydrophobic surfaces present a very limited mechanical wear robustness and long-term durability [1]. It has reduced their utilization in industrial applications where both requirements are needed, as building elements outdoor. Existing a large number of works about hydrophobic coating developments [2,3,4], but in them it is not assessed the hydrophobicity when the coating surface is subjected to wear processes. On the other hand, in the literature there are works about wear resistant coatings, but they do not provide hydrophobic performance [5]. The aim of this work has been to develop of transparent nanocoating with hydrophobic and wear resistant properties simultaneously. It is based on functionalisated SiO2 nanoparticles. It has been applied and evaluated on mortar specimens, through hydrophobic and wear testing. It is proven its hydrophobic/superhydrophobic character and enhanced wear behaviour.

References

[1] Athanasios Milionis et al, Advances in Colloid and Interface Science 229 (2016) 57–79.
[2] Ali Arabzadeh et al, Construction and Building Materials 141 (2017) 393–401.
[3] Michele Ferrari et al, Advances in Colloid and Interface Science 222 (2015) 291–304.
[4] M.F. Montemor, Surface & Coatings Technology 258 (2014) 17–37.
[5] Hui Zhang et al, Tribology International 43 (2010) 83–91.

Figures

Figure 1: Superhydrophobic behaviour (CA above 160º) of the developed transparent nanocoating applied on mortar specimen, after 40 cycles of abrasion test.