Functional Surfaces with Designed Wetting and Photocatalytic Properties

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The incorporation of semiconductor photocatalystic particles in an appropriate support or binder material is expected to create photoreactive, antimicrobial and self- cleaning properties, which would extend its filed of application. The state-of-the-art materials at the area of photocatalyst/ polymer hybrid layers are the functional surfaces, which are gaining attention for different practical applications, such as self-cleaning superhydrophobic coating [1]. Moreover, the adjustable properties and easy modification of different polymers and composites are also well known from literature. For example, the wetting properties of a polymer surface can be easily adjusted with the monomer composition using hydrophilic and hydrophobic monomers in an adequate ratio [2]. So, if we use polymeric material for the photocatalyst immobilization, a very functionable hybrid surface can be obtained.

In this work the synthesis of photoreactive hybrid thin layers and nanoparticles with tunable wetting properties from superhydrophilic to superhydrophobic nature will be presented [2]. The incorporation of photocatalyst nanoparticles as filler material into the polymer matrix was ensured the adequate surface roughness of the polymer layer. Beside the structural, morphological and wetting properties of the composite layers and nanoparticles the photocatalytic and antibacterial efficiency was also studied and it was found that at solid/ liquid interface the photocatalytic efficiency were depend on the polarity of the used model pollutants [3]. This dual superhydrophobic and photoreactive coatings with selective surface wetting and antibacterial properties are very attractive in different applications [4].

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