

Accepted Manuscript

Antibacterial surfaces prepared by electrospray coating of photocatalytic nanoparticles

Blanca Jalvo, Marisol Faraldos, Ana Bahamonde, Roberto Rosal

PII: S1385-8947(17)31970-8
DOI: <https://doi.org/10.1016/j.cej.2017.11.057>
Reference: CEJ 18028

To appear in: *Chemical Engineering Journal*

Received Date: 7 July 2017
Revised Date: 7 November 2017
Accepted Date: 11 November 2017

Please cite this article as: B. Jalvo, M. Faraldos, A. Bahamonde, R. Rosal, Antibacterial surfaces prepared by electrospray coating of photocatalytic nanoparticles, *Chemical Engineering Journal* (2017), doi: <https://doi.org/10.1016/j.cej.2017.11.057>



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Antibacterial surfaces prepared by electrospray coating of photocatalytic nanoparticles

Blanca Jalvo¹, Marisol Faraldos²*, Ana Bahamonde², Roberto Rosal¹*

¹ Department of Chemical Engineering, University of Alcalá, E-28871 Alcalá de Henares, Madrid, Spain

² Instituto de Catálisis y Petroleoquímica, ICP-CSIC, Marie Curie 2, E-28049 Madrid, Spain

*Corresponding authors: roberto.rosal@uah.es, Tel.: +34918856395, Fax: +34918855088, mfaraldos@icp.csic.es, Tel.: +34915854820, Fax: +34915854760

Abstract

The aim of this work was to use electrospray to create photocatalytic TiO₂ coatings and to study their antibacterial and antibiofilm capacity. The electrospray used a sol of TiO₂ anatase nanoparticles prepared by a sol-gel method, which formed stable suspensions of positively charged particles (ζ -potential $+22.3 \pm 3.7$ mV). The electrospray deposited TiO₂ on non-porous glass surfaces at two loading densities originating homogeneous coatings (3.2-4.3 μm) of particles the top layer of which displayed aggregates ranging from the micron scale to a few hundreds of nanometers, with lower size as TiO₂ loading increased. TiO₂-functionalized surfaces were tested for the inactivation of the Gram-positive bacterium *Staphylococcus aureus*. The electrosprayed surface was moderately hydrophilic turning highly hydrophilic upon irradiation (water contact angle 9.6° after 15 h under Xe-arc lamp). photocatalytic surfaces were put in contact with exponentially growing bacterial cultures in a flow system in which solar simulated irradiation followed two different 24 h dark-light arrangements with 9 or 18 h dark exposure followed by 15 or 6 h irradiation. The electrosprayed surfaces

Download English Version:

<https://daneshyari.com/en/article/6581091>

Download Persian Version:

<https://daneshyari.com/article/6581091>

[Daneshyari.com](https://daneshyari.com)