2nd Latin-American Congress of Photocatalysis
Guadalajara, Jalisco, México.
September 24-27, 2013.

Jun 10th, 2013.

Dear : **Cruz-Rodriguez**

I am pleased to inform you that your contribution **Hydroxylation/dehydroxylation Effect of TiO2 Photocatalytic Coatings for the Degradation of Fatty Acids** by the authors **D. Cruz-Rodríguez, V. Guzmán-Velderrain, J. Salinas-Gutiérrez, A. López-Ortiz, V. Collins-Martínez**, has been accepted for to be presented in the 2nd Latin-American Congress of Photocatalysis, as **P-12**, to be held in Guadalajara, Jalisco, México from September 24-27, 2013.

Your contribution should be presented in the **poster** modality.

Sincerely yours,

Alejandro Pérez Larios, PhD

Vicente Rodriguez Gonzalez, Ph. D

Chairmen, LACP 2013

Hydroxylation/dehydroxylation Effect of TiO_2 Photocatalytic Coatings for the Degradation of Fatty Acids

D. Cruz-Rodríguez, V. Guzmán-Velderrain, J. Salinas-Gutiérrez, A. López-Ortiz, V. Collins-Martínez*

*Centro de Investigación en Materiales Avanzados S. C., Laboratorio Nacional de Nanotecnología, Depto. de Materiales Nanoestructurados, Miguel de Cervantes 120, C. P. 31109, Chihuahua, Chih. México. Tel: +52 (614)439 11 29 * e mail: virginia.collins@cimav.edu.mx*

Introduction: Cleaning grease stained surfaces is difficult, as these may contain porous and irregular surfaces facilitating the embedding of substances such as volatile fatty acids (VFA). The cleaning of these surfaces can be achieved through the photocatalytic degradation of VFA. The objective of this research is to synthesize and characterize TiO_2 coatings on porcelain (model substrate) at different synthesis conditions and to study the hydroxylation/dehydroxylation (H/D) effect on its photocatalytic properties.

Experimental: TiO_2 films were synthesized by Sol-Gel from four solutions (SH, SVM1, SVM2 and ETH) prepared using titanium tetraisopropoxide (TTIP) as main precursor. SH solution was prepared using TTIP, isopropyl alcohol, distilled water, and acetic acid [1]. SVM1 was synthesized similarly to SH but followed a hydrothermal treatment (HT) at 80°C for 1h. SVM2 was prepared as SVM1, but at 80°C under HT for 2h. ETH was synthesized by mixing TTIP, ethanol, distilled water and HCl followed by HT (80°C, 2h) [2]. As a reference a TiO_2-P25 coating was also prepared. Porcelain boats were dip-coated with each solution and exposed at 450°C for 1h. Characterization was performed using XRD, SEM, BET-area, TGA (water adsorption/desorption) and UV-Vis spectroscopy techniques. A water-butyric acid (BA) solution was placed in each coated boat and exposed to a 15W black light irradiation lamp. BA degradation was followed by Raman spectroscopy.

Results and Discussion:

The anatase crystal structure was present in all coatings, (XRD results). SEM results indicate a non-uniform coating with cracks for SH, while SVM1 and SVM2 showed increased homogeneity and cracks reduction due to coating densification by the HT [3]. ETH coating presented results similar to SH, which was attributed to a fast evaporation of ethanol. Average BET-area for SH, SVM1 and SVM2 was 113 m^2/g. While for ETH and P25 was 55 m^2/g. All synthesized films presented bandgap values from 3 to 3.2 eV, being consistent with those reported for TiO_2-Anatase. Photocatalytic degradation of BA resulted in SVM2 exhibiting the highest degradation followed by P25-TiO_2, whereas SH, SVM1 and showed lower values (Figure 1-a). It was found that there is a direct relationship between the H/D ability of TiO_2 coatings (Figure 1-b) and the photocatalytic degradation of VFA. Hydroxyl groups play a key role in photocatalysis and this behavior can be explained on the basis that TiO_2 materials presumably presents less photocatalytic activity due to a low dehydroxylation, since this reduces the capture of holes, increasing the recombination of the electron-hole pair, thus affecting the photoactivity, since dehydroxylation is responsible for the eventual deactivation of the photocatalyst [4].

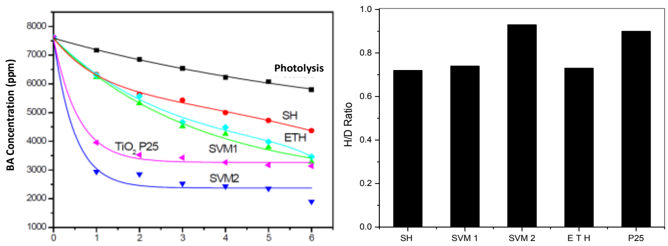

Figure 1. (a) BA conversion, (b) H/D ratio for all coatings

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[4] Di Paola A., Marcı`G., Palmisano L., Schiavello M., Uosaki K., Ikeda S., Ohtani B., J. Phys. Chem. B 106 (2002) 637-645.

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TO WHOM IT MAY CONCERN
Present

This is to certify that **D. Cruz-Rodríguez, V. Guzmán-Velderrain, J. Salinas-Gutiérrez, A. López-Ortiz, V. Collins-Martínez**
Presented the contribution: **Hydroxylation/dehydroxylation Effect of TiO2 Photocatalytic Coatings for the Degradation of Fatty Acids.** in the 2nd. Latin-American Congress of Photocatalysis (LACP 2013) held in Guadalajara, Mexico from September 24th to 27th, 2013.

PHOTOCATALYSIS

Sincerely

Alejandro Pérez Larios
Chairman