Sessions: Nanotechnology

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Synthesis and Characterization of Bi_2WO_6 and study of its photocatalytic activity in the degradation of pesticides under visible light.

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Abstract:

Highly crystalline bismuth tungstate (Bi_2WO_6) photocatalytic particles with visible high light photocatalytic activity were synthesized controlled by a hydrothermal process. [1-2] The structures and morphologies of the phases were measured by X-ray diffraction (XRD), scanning electron microscopy (MEV). XRD standards demonstrated that the samples prepared as Bi_2WO_6 were orthorhombic cells. The MEV showed that the crystals of Bi_2WO_6 with distinct morphologies can be selectively obtained by adjusting the reaction parameters of the hydrothermal process with reaction time, temperature and Ph[3]. The mechanisms of formation of these distinct structures were then discussed based on the morphological analysis of samples prepared under different conditions. The morphology (Figure 1 and 2) in flower form Bi_2WO_6 presented greater photocatalytic activity compared to the nanofibrous and spherical morphologies of Bi_2WO_6 under irradiation with visible light (> 420 nm). The reason for the difference in photocatalytic activities for the three representative samples was systematically studied based on their shape, size and specific surface area analyzed by diffuse reflectance spectroscopy (MRD). (Figure 3) Photocatalytic tests performed in standard system under 9 watts C ultraviolet-C radiation to degrade solutions of commercial pesticides and dyes such as Rhodamine B. From UV-Vis spectroscopy with diffuse reflectance (Figure 4), we determined the concentration of commercial pesticides in each aliquot, the results of the pesticide degradation curves were compared, to conclude that the morphology of Bi_2WO_6 is more efficient to degrade the substances in solution.

Keywords: MORPHOLOGY, PHOTOCATALYSTS, PESTICIDES.

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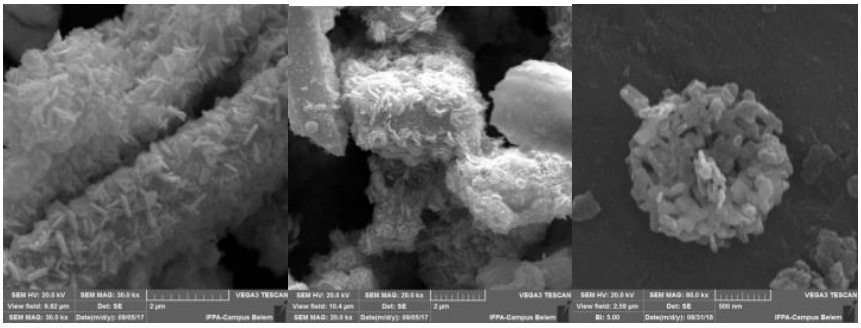

(A) (B) (C)

Figura 1. Images of structures synthesized by MEV, 1(A) rod-like, 1(B) flower-like e 1(C) spherical.

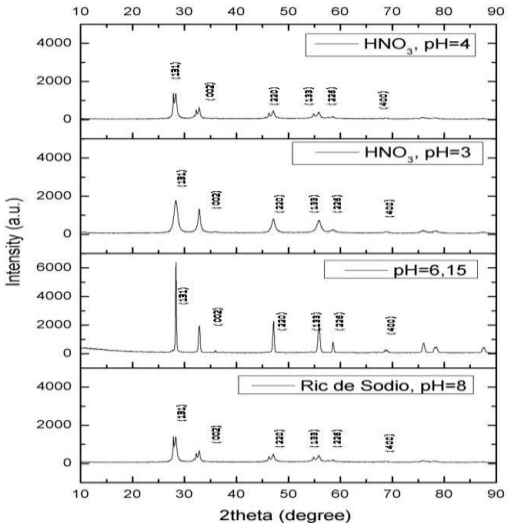

Figura 2. Curves at Θ=20°; of the photocatalyst.. Rod-like (pH=6,15), flower-like (pH= 4 e 8), and spherical (pH=3)