Contribution ID: **345** Type: **Oral**

EVALUATION OF THE PHOTOCATALYTIC DECOMPOSITION OF METHYL ORANGE, USING 3 TO 1 MOLAR MIXTURES OF BISMUTH OXYBROMIDE AND OXYCHLORIDE

Given the growing usage and consumption of water resources, humankind needs to develop relevant and economic procedures to be able cleaning and purifying used water, in order to promote its reuse and possible reintegration into the environment, as well as to prevent its contribution to further contaminate soils. One could say that such is the wider purpose for the improvement of photocatalysts' efficiency in decontamination processes. Furthermore, they could play an important role in the cost-effective production of hydrogen for energy purposes. Heterojunction photocatalysts are pertinent contenders to achieve efficient visible light mediated photocatalytic processes. In this work, it is evaluated the performance in photocatalytic Methyl Orange degradation by four BiOBr/BiOCl composites, all with a molar ratio of 3 to 1, which are compared with a $BiOCl_{0.25}Br_{0.75}$ solid solution obtained by a simple precipitation route (sample M5). Three different processing methods were used to prepare four 3:1 composite samples starting from pure BiOBr and BiOCl obtained by precipitation; one by hydrothermal treatment (M1), and one by dry milling process of the mixtures (M2), and two by precipitation of BiOY (Y: Br, Cl) in the presence of BiOX (X: Cl, Br) (M3 and M4). The hydrothermally treated sample resulted in the formation of a solid solution $BiOCl_{1-x}Br_x$ (x ~ 0.8). On the other hand, the precipitation of BiOCl over BiOBr, resulted in the diffusion of chlorine ions into oxybromide lattice; more evident than bromine into oxychloride's. Meanwhile, the manually milled sample has the presence of both pure bismuth oxyhalides, as far as XRD and Raman spectroscopy results show. The photocatalytic activity of the samples under UV illumination was comparable to that of commercial TiO2, specially for samples M5, M4 and M1; otherwise, despite poorly active under visible light, samples M3, M4, and M1 had best results.

Reference

Opcional

This work was supported by

Universidad de Guadalajara, under programs proSNI and PROINPEP.

Keywords

Composites, BiOBr, BiOCl, Photocatalysis

Author approval

I confirm

Author will attend

I confirm

Authors: Mr CASTILLO-NUÑO, Josué Alejandro (Maestría en Ciencia de Materiales, CUCEI, Universidad de Guadalajara.); Mr FLOREZ-RÍOS, John Fredy (Doctorado en Ciencias en Física, CUCEI, Universidad de Guadalajara.); Dr MORÁN-LÁZARO, Juan Pablo (Departamento de Ciencias Computacionales e Ingenierías, CUValles, Universidad de Guadalajara.); CHAVEZ CHAVEZ, Arturo (Departamento de Física CUCEI); PÉREZ CENTENO, Armando (Departamento de Física, Centro Universitario de Ciencias Exactas e Ingenierías, Universidad de Guadalajara); SANTANA-ARANDA, Miguel Angel (Departamento de Física, CUCEI, Universidad de Guadalajara)

Presenter: SANTANA-ARANDA, Miguel Angel (Departamento de Física, CUCEI, Universidad de Guadalajara)

Session Classification: RENEWABLE ENERGY

Track Classification: Renewable Energy: Materials and Devices