



**XXXII** **B-MRS** **2024**  
**Meeting**  
September 29th to October 3rd

**PROCEEDINGS**

# Synthesis, characterization, and photocatalytic performance of nanostructured ZnO films under UV light

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The limited natural water resources have been contaminated by effluents originating from both the industrial and domestic sectors. A large portion of the available water is consumed in chemical processes in various industrial sectors, including textiles, paper, and leather. Also, the inappropriate disposal of pharmaceuticals and dyes on a large scale results in effluent contamination. Methyl orange is one of the most widely used azo dyes on a large scale. Photocatalysis is a promising green alternative for the removal of organic dyes in wastewater. This research aimed to synthesize and characterize nanostructured zinc oxide films to obtain a UV-light-activated photocatalyst capable of degrading organic compounds. The films were obtained using the sol-gel method. Zinc acetate, MEA, and ethanol were kept under constant stirring for 60 minutes at 70°C. The solution obtained was sprayed onto cleaned borosilicate glass substrates by using an airbrush. The samples were then heat treated at temperatures of 450 and 500°C for 45 minutes. The characterization of the films was performed using X-ray diffraction (XRD), field-emission scanning electron microscopy (FE-SEM), UV-Vis spectrophotometry and wettability. The efficiency of the films was determined by the degradation of a 5 mg.L<sup>-1</sup> methyl orange dye water solution at neutral pH, at constant temperature of 20°C, and under two sources of ultraviolet radiation ( $\lambda=352$  nm) for 300 minutes. The films exhibited hydrophilic characteristics and superficial morphology consisting of spherical nanoparticles. The films showed photoactivity when exposed to UVA radiation, with the best performance in removing methyl orange dye being 48.6% for the film treated at 500°C. This removal value can be attributed to the improvement in the homogeneity of the morphology and thickness of the film treated at 500°C.

Acknowledgments:

The authors are grateful to CAPES Brazilian Agency by the grant received.