The Serbian Society for Ceramic Materials
Institute for Multidisciplinary Research (IMSI), University of Belgrade
Institute of Physics, University of Belgrade
Center of Excellence for the Synthesis, Processing and Characterization of Materials for use in Extreme Conditions "CEXTREME LAB" - Institute of Nuclear Sciences "Vinča", University of Belgrade
Faculty of Mechanical Engineering, University of Belgrade
Center of Excellence for Green Technologies, Institute for Multidisciplinary Research, University of Belgrade
Faculty of Technology and Metallurgy, University of Belgrade

PROGRAMME and the BOOK of ABSTRACTS

6CSCS-2022

6th Conference of the Serbian Society for Ceramic Materials
June 28-29. 2022. Belgrade Serbia

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Branko Matović
Aleksandra Dapčević
Vladimir V. Srdić

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ENHANCED PHOTOCATALYTIC REMOVAL OF CONGO RED BY MOF-ACTIVATED CARBON COMPOSITE

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Rapid industrialization and increasing population have increased the water demand. Various wastes from industries and anthropogenic activities are discharged into aquatic bodies such as lakes, ponds, rivers, oceans. Therefore, focus is placed on the removal of the contamination from the wastewater.

Organic pollutants gained extensive attention because of their toxicity, persistence and significant impacts on human health Among them, organic dyes are complex molecules and most of them are water-soluble, resistant to detergents and heat, exhibit poor biodegradability, etc. Azo dyes are used in about 70% of commercial dyes today, from textile and plastic to cosmetics and food.

In this work, removal of azo-type dye Congo Red (CR) from water was performed by using UiO-66 type MOF (Metal Organic Framework), activated carbon (AC) and their composite powder mixture (MOF/AC = 50/50 wt.%). Samples were exposed to solar light irradiation for 1h and 2.5 h, respectively, centrifuged to remove solid particles, and solutions were analyzed by UV-ViS spectrophotometer in order to determine the concentration of the remaining dye. Process was repeated three times in order to explore the renewability of the photocatalysts used, with catalysts dried at 50 °C between cycles. Results revieled superior photocatalytic cycling performance of the MOF compared to the MOF/AC composite, while AC showed decline in dye removal performance due to the saturation of available adsorption sites. MOF/AC composite exhibited beneficial cost/performance ratio.

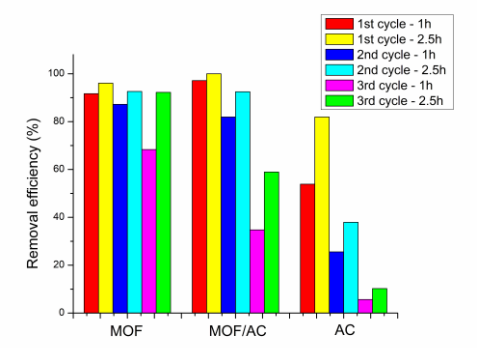

Figure 1. Removal of the CR from the water by using three different catalysts