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SVEUČILIŠTE U SPLITU

KEMIJSKO-TEHNOLOŠKI FAKULTET

## 3. ZORH SUSRET

28. I 29. TRAVNJA 2022., SPLIT

*Knjiga sažetaka*



Fakulta materiálov,  
metalurgie a recyklácie





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UNIVERSITY OF SPLIT  
FACULTY OF CHEMISTRY AND  
TECHNOLOGY

# 3RD ZORH CONFERENCE

SPLIT, APRIL, 28TH - 29TH, 2022

*Book of Abstracts*



Fakulta materiálov,  
metalurgie a recyklácie



## **PUBLISHER**

University of Split, Faculty of Chemistry and Technology, Ruđera Boškovića 35, 21000 Split

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**ISBN 978-953-7803-16-2**

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## **MODIFIKACIJA POVRŠINE TITANIJUM-DIOKSIDA SREBRO(I)-OKSIDOM KAO KATALIZATORA ZA FOTOKATALITIČKU DEGRADACIJU FUNGICIDA**

## **MODIFICATION OF TITANIUM-DIOXIDE SURFACE WITH SILVER(I)-OXIDE AS A CATALYST FOR PHOTOCATALYTIC DEGRADATION OF FUNGICIDE**

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Pollution of water presents one of the biggest problems of modern society. Pesticide production, usage and release, as well as their persistence in the environment, have detrimental effects on the aquatic and non-target species. Therefore, it is necessary to apply treatment techniques in order to prevent these negative consequences. The processes used so far do not have the necessary efficiency to optimally solve this problem. Hence, plenty of advanced oxidation processes (AOPs) has been developed, among which photocatalysis has stood out. Thus, photocatalytic degradation of fungicide thiophanate-methyl by using recently synthesized catalyst  $\text{Ag}_2\text{O}/\text{TiO}_2$  was considered. The effect of the various parameters, such as catalyst amount, fungicide concentration, and also the distance of the lamp from the photocatalytic reactor was studied. The obtained photocatalyst was examined using Fourier transform infrared spectroscopy (FTIR), Scanning electron microscopy (SEM), as well as Diffuse reflectance spectroscopy (DRS). Photocatalytic assays employing  $\text{Ag}_2\text{O}/\text{TiO}_2$  catalyst with the concentration of 0.065 g/l yielded the best results. The degradation rate constant was measured as  $0,040 \text{ min}^{-1}$  by observing values of absorbances from the UV spectrophotometer Shimadzu 1800. Under the optimal conditions, the complete disappearance of 10 mg/l of fungicide occurred within 2 h by using  $\text{Ag}_2\text{O}/\text{TiO}_2$ . However, the limitation of the applied process is reflected in the volume of wastewater that can be treated, while making it economically viable. Obtained results show that synthesized catalysts pose a great ability to effectively decompose thiophanate-methyl under UV light.

*Key words:* photocatalysis, thiophanate-methyl, silver-based catalyst; pollutant removal