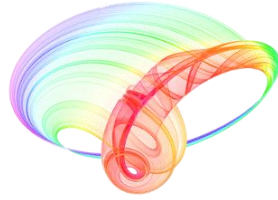


Book of abstracts



PHOTONICA2021

VIII International School and Conference on Photonics

& HEMMAGINERO workshop

23 - 27 August 2021,

Belgrade, Serbia

Editors

Mihailo Rabasović, Marina Lekić and Aleksandar Krmpot

Institute of Physics Belgrade, Serbia

Belgrade, 2021

ABSTRACTS OF TUTORIAL, KEYNOTE, INVITED LECTURES,
PROGRESS REPORTS AND CONTRIBUTED PAPERS

of

VIII International School and Conference on Photonics
PHOTONICA2021

23 - 27 August 2021

Belgrade Serbia

Editors

Mihailo Rabasović, Marina Lekić and Aleksandar Krmpot

Publisher

Institute of Physics Belgrade

Pregrevica 118

11080 Belgrade, Serbia

Printed by

Serbian Academy of Sciences and Arts

Number of copies

200

ISBN 978-86-82441-53-3

CIP - Каталогизacija у публикацији - Народна библиотека Србије, Београд

535(048)

621.37/.39:535(048)

621.37/.39:535]:61(048)

66.017/.018(048)

INTERNATIONAL School and Conference on Photonic (8; 2021; Beograd)

Book of abstracts / VIII International School and Conference on Photonics PHOTONICA2021 & HEMMAGINERO workshop, 23 - 27 August 2021, Belgrade, Serbia; editors Mihailo Rabasović, Marina Lekić and Aleksandar Krmpot. - Belgrade: Institute of Physics, 2021 (Belgrade: SASA). - V, 192 str.: ilustr.; 30 cm

Tiraž 200. - Bibliografija uz većinu apstrakata. - Registar.

ISBN 978-86-82441-53-3

1. Hemmaginero Workshop (2021; Beograd)

а) Оптика -- Апстракти б) Оптички материјали -- Апстракти в) Оптоелектроника -- Апстракти г) Оптоелектроника -- Биомедицина -- Апстракти д) Телекомуникације -- Апстракти

COBISS.SR-ID 44290057

Influencing on optical properties of buffered TiO₂-Au thin film systems by deposition and annealing parameters

N. Milicevic¹, M. Novakovic¹, J. Potocnik¹, L. Rakocevic¹, M. Milovic¹, N. Abazovic¹ and D. Pjevic¹

¹Vinca Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade, Belgrade, Serbia

e-mail: nemanja.milicevic@vin.bg.ac.rs

One of the ways to increase efficiency of TiO₂ thin films is by doping and coating with metals. Metal-doped TiO₂ can reduce electron-hole recombination and increase hydroxyl radical concentration on the surface of TiO₂, resulting in increase in the photocatalytic activity. Recent studies of J. Li et al. [1] and S. Y. Lee et al. [2] with Au doped TiO₂ thin films showed that these systems have enhanced photocatalytic activity in comparison to pure TiO₂ thin films. Also, recent study [3] showed that Au-doped TiO₂ thin films are great candidates beside photocatalysis for enhancing visible light water splitting. TiO₂ and TiO₂:Au thin films were obtained by DC magnetron sputtering of Ti target with Ar ions in O₂ atmosphere. In the case of doped TiO₂ thin films with Au, three different systems were deposited for comparison (Fig. 1). Post-deposition annealing for 3 h at 400 °C was carried out in nitrogen atmosphere. For structural analyses XRD, XPS, TEM and AFM methods were used, while for optical characterization UV/Vis method was used. The photo-degradation rate was measured using Rhodamine B which simulated pollutant. Analysis of the binding energy in the corresponding XPS spectra showed that deposited films have good stoichiometry of TiO₂ and that concentration of Au on the surface can be controlled by sputtering and annealing conditions. Post-deposition annealing caused diffusion of Au atoms through the layer as it was shown by TEM and EDS. Obtained TiO₂ thin films before deposition were amorphous-like structured, and after annealing at 400 °C showed that anatase phase dominates in the structure. All Au-doped TiO₂ thin films showed better photo-degradation rates than pure TiO₂.

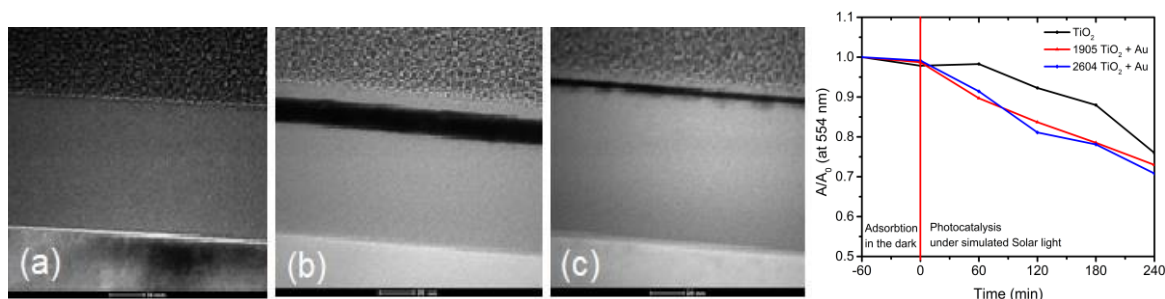


Fig. 1. TEM images of as-deposited TiO₂ and buffered TiO₂-Au systems. **Fig. 2.** Photocatalytic measurement.

REFERENCES

- [1] J. Li, Z. Chen, J. Fang, Q. Yang, X. Yang, W. Zhao, D. Zhou, X. Qian, C. Liu, J. Shao, Facile synthesis of TiO₂ film on glass for the photocatalytic removal of rhodamine b and tetracycline hydrochloride, *Mater. Express*. 9 (2019) 437–443.
- [2] S. Youl Lee, D. Kang, S. Jeong, H. Tung Do, J. Heon Kim, Photocatalytic Degradation of Rhodamine B Dye by TiO₂ and Gold Nanoparticles Supported on a Floating Porous Polydimethylsiloxane Sponge under Ultraviolet and Visible Light Irradiation, *Cite This ACS Omega*. 5 (2020) 4233–4241.
- [3] A. Sreedhar, I.N. Reddy, J.H. Kwon, J. Yi, Y. Sohn, J.S. Gwag, J.S. Noh, Charge carrier generation and control on plasmonic Au clusters functionalized TiO₂ thin films for enhanced visible light water splitting activity, *Ceram. Int.* 44 (2018) 18978–18986.