Alla Tereshchenko et al., Madridge J Immunol. 2017
http://dx.doi.org/10.18689/2638-2024.a1.004

madridge CONFERENCES

International Conference on
Immunology and Immunotechnology

November 1-3, 2017 Barcelona, Spain

Optical Immunosensor Based on Photoluminescence of ZnO Thin Films for the Detection of GVA-Antigen Proteins

Alla Tereshchenko[1], Viktoriia Fedorenko[1,2], Valentyn Smyntyna[1], Igor Konup[3], Anastasiya Konup[4], Martin Eriksson[5], Rositsa Yakimova[5], Sebastien Balme[2], Mikhael Bechelany[2] and **Arunas Ramanavicius[6]**

[1]Experimental Physics Department, Odessa National I. I. Mechnikov University, Ukraine
[2]Institut Européen des Membranes IEMM, France
[3]Department of Microbiology, Virology and Biotechnology, Odessa National I. I. Mechnikov University, Ukraine
[4]National Scientific Centre "Institute of Viticulture and Wine Making Named After V. Ye. Tairov", Ukraine
[5]Department of Physics, Chemistry and Biology, Linköping University, Sweden
[6]Department of Physical Chemistry, Vilnius University, Sweden

Photoluminescence based immunosensor for the determination of *Grapevine virus A-type* (GVA) proteins (GVA-antigens) has been developed [1]. The immunosensor was based on thin films of ZnO (100 nm thickness) formed on the Silicon substrates by atomic layer deposition (ALD). The ZnO-based films have demonstrated favorable surface-structural properties for the direct immobilization of antibodies against GVA-antigens in order to form a biosensitive layer sensitive to the GVA antigens. The absorption of anti-GVA antibodies resulted in a new photoluminescence band appearance in the region of 400-550 nm (Fig. 1) that can be caused by the formation of some chemical bounds during the anti-GVA adsorption on ZnO surface. The possibility to detect GVA-antigens without additional labels (e.g enzymes or fluorescent dyes) has been demonstrated. The GVA-antigen detection was performed by the evaluation of changes and behavior of the photoluminescence band, related to protein adsorption. The sensitivity of as-formed label-free biosensor towards the GVA-antigens was determined in the range from 1 pg/ml to 10 ng/ml.

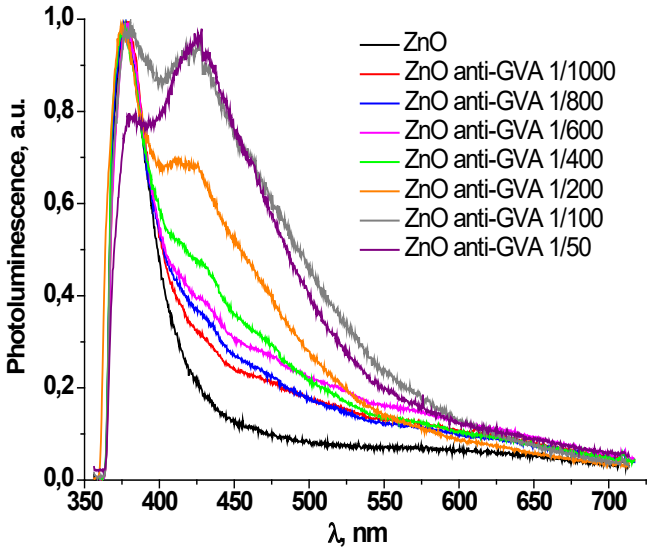

Fig.1. Photoluminescence spectra of ZnO_{100nm} clean and ZnO_{110nm} immobilized by different concentrations of anti-GVA antibodies.

References:

[1] A. Tereshchenko, V. Fedorenko, V. Smyntyna, I. Konup, A. Konup, M. Eriksson, R. Yakimova, A. Ramanavicius, S. Balme, M. Bechelany. ZnO films formed by atomic layer deposition as an optical biosensor platform for the detection of Grapevine virus A-type proteins, *Biosensors and Bioelectronics*, 2017, 92, 763–769.