

## SILVER NANOWIRE ARRAY SENSOR FOR SENSITIVE AND RAPID DETECTION OF H<sub>2</sub>O<sub>2</sub>

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A rapid, accurate and reliable determination of hydrogen peroxide traces is important issue due to the fact that H<sub>2</sub>O<sub>2</sub> plays a crucial role in many fields including food, pharmaceutical, chemical and biochemical industries and in clinical control and environmental protection [1]. Determination of the concentration of hydrogen peroxide is often essential issue in clinical trials. It is noteworthy that the excess of H<sub>2</sub>O<sub>2</sub> may be involved in the etiology of aging and progressive neurodegenerative diseases, such as Parkinson's disease [2]. On the other hand, the presence of H<sub>2</sub>O<sub>2</sub> can affect the indirect determination of the level of glucose in the blood [3, 4].

In the present work nanostructured electrochemical H<sub>2</sub>O<sub>2</sub> sensor was prepared by simple cathodic electrodeposition of noble metals inside home-made nanoporous alumina (AAO) templates or on the surface of silver-coated supports. Anodic porous alumina templates was synthesized via a simple and cost-effective two-step anodization of aluminum. After suitable treatment, metallic nanostructures (nanowire/nanorod arrays, nanoporous thin films) was obtained and investigated as amperometric sensors for the detection and determination of hydrogen peroxide in the presence of various interfering substances [5-6] showing good sensitivity, repeatability and accuracy.

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### Literature

- [1] O. Wolfbeis, A. Drkop, M. Wu, Z. Lin, *Angew. Chem. Int. Ed.* 41 (2002) 4495
- [2] Y. Luo, H. Liu, Q. Rui, Y. Tian, *Anal. Chem.* 81 (2009) 3035
- [3]. Thome-Duret, G. Reach, M.. Gangnerau, F. Lemonnier, J.C. Klein, Y. Zhang, Y. Hu, G.S. Wilson, *Anal. Chem.* 68 (1996) 3822
- [4] A. Heller, *Curr. Opin. biotechnology* 7 (1996) 50
- [5] E. Kurowska-Tabor, M. Jaskuła, G.D. Sulka, *Electroanalysis*, 27 (8) (2015) 1968
- [6] E. Kurowska-Tabor, K. Gawlak, K. Hnida, M. Jaskuła G.D. Sulka, *Electrochimica Acta*, 213 (2016) 811.

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