

Nanostructured surfaces

Adsorption properties of BSA-based nanostructured films

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Proteins are widely used for the development of biosensors [1]. Bovine serum albumin (BSA) is a globular protein which can be considered as a natural nanoparticle with all the features and advantages typical for nanosized objects. BSA is complex molecule with many functional groups that can act as adsorption centers with different properties. Although proteins are usually used for sensors operating in liquid we believe that they have great potential for gas sensing as well.

BSA were deposited onto three different surfaces: (1) thermally sputtered C60 nanostructured film, (2) thermally sputtered organic film of NiTAA and (3) silver electrode of the quartz crystal microbalance (QCM) sensor. The adsorption properties of resulting hybrid films were studied in gas phase and have demonstrated strong dependence on the nature of the bottom layer.

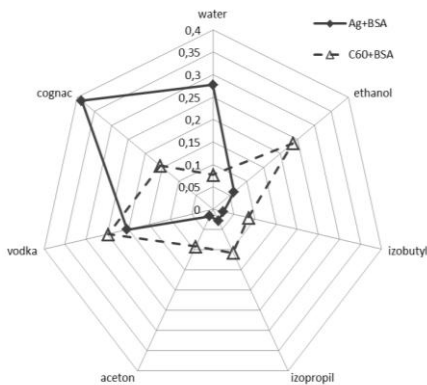


Fig. 1 – Selectivity profiles of Ag-BSA and C60-BSA based QCM sensors

On Fig. 1 the selectivity profiles of Ag-BSA and C60-BSA QCM sensors towards water, alcohols, acetone and beverages are presented. There is a significant difference between the two sensors, which can be explained by different ways of BSA bonding to the various surfaces and it's different orientation as a result. Thus, we obtain different protein fragments capable of interacting with an analyte. In such a way, it is possible to get sensors with different sensitivity profiles by using various substrates coated with

the same protein. This is a prerequisite for their application in multisensor arrays.

1. *Chenyi Hu, Da-Peng Yang, Kuan Xu, Hongmei Cao, Beina Wu, Daxiang Cui, Nengqin Jia.* Ag@BSA Core/Shell Microspheres As an Electrochemical Interface for Sensitive Detection of Urinary Retinal-Binding Protein. *Anal. Chem.* -2012. -**84**, P.10324–10331.