

Integration of nanostructured sensor for the electrochemical detection of biomarkers: towards search for life in space

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Nowadays, metallic nanoparticles with various shape have been largely used for the fabrication of new sensors due to their fascinating properties. One particular shape has attracted much attention because of its large surface-to-volume ratio and high sensitivity: the dendritic nanostructures. These anisotropic nanoparticles are often made of noble metals, such as gold that owns a good biocompatibility and high plasmonic effect ^[1].

The present work describes a controlled growth pattern-directed organisation of gold flower-like crystals deposited onto gold quartz QCM resonator to achieve large-scale nanostructured surfaces of detection. This technique consists first, in the deposition of a nanoporous polymer template, on which gold crystals are electrochemically grown. Then, the adsorption of amino acids on those structures can be realized by different ways. The detection of the adsorbed molecules onto these nanostructured surfaces, has been carried out optically and electrochemically.

The last step of this work focuses on the regeneration of the substrate that allows the recovery of the sensor to its initial state to continue another cycle of detection of molecules. This device is a first step before its integration in a lab-on-chip system.

References:

[1] E. Le Ru and P. Etchegoin, *Elsevier*, 2009.

