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Semiconductors nanostructures for bio-interface and life sciences

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1. EDITORIAL

Controlling the interaction between nanostructures and bio-systems is ongoing topic inthe scientific community. In particular, inorganic semiconductor nanostructures (porousstructures, nanowires, and nanoparticles) are interesting platform for ultrasensitive, directdetection of biological and chemical species based on optical and electrical responses.The contribution of Dutt *et al*. presents the synthesis of Polyaniline Nanostructure(PANI-NS) using swollen liquid crystal (SLC) as soft templates that show high sensitivity,low detection limits and better linear range of detection for the electrochemical detection ofH_2O_2 as well as amperometric biosensing of glucose. The nanostructured PANI was not onlyhighly sensitive for glucose sensing, but also showed very good selectivity for glucose againstcommon biological interfering agents. Although the concept has been presented within thecontext of H_2O_2 sensing and glucose sensing, it could be readily extended to other biosensingapplications.Various metal complexes are nowadays used in anticancer therapy and conducted to a largeinterest from chemists, biologists and organo-metallurgists to develop drugs of future. Thelow cytotoxicity of ferrocene and its malleability have made it an interesting anticancer agent.Goumri-Said from Georgia Institute of Technology reports a theoretical modeling andcomputational study of the optical properties and electronic structure of ferrocene-substituted dithio-o-carborane conjugate in order to understand it structure andcontrol its properties for future biological purposes. It is found that the ferrocene is asemiconductor with large bandgap, which may lead us to consider large possibilities to tailorits optical spectrum for special role depending on the environment.In this special issue, includes a mini-review paper by Jouiad *et al*. reports the structuralproperties of porous silicon nanowires (PSiNWs) fabricated using silver (Ag) ions assistedelectroless etching method. The sensitivity of PSiNWs electrical properties to gaseous NOx atroom temperature was demonstrated. Also, the results showed that the surface-enhancedRaman spectroscopies (SERS)-active substrates prepared by this method are excellentcandidates for MG molecules sensing with high sensitivity, good reproducibility and excellentstability. The excellent sensing performance coupled with scalable synthesis of porous SiNWscould open up opportunities in scalable production of sensor chips working at roomtemperature.