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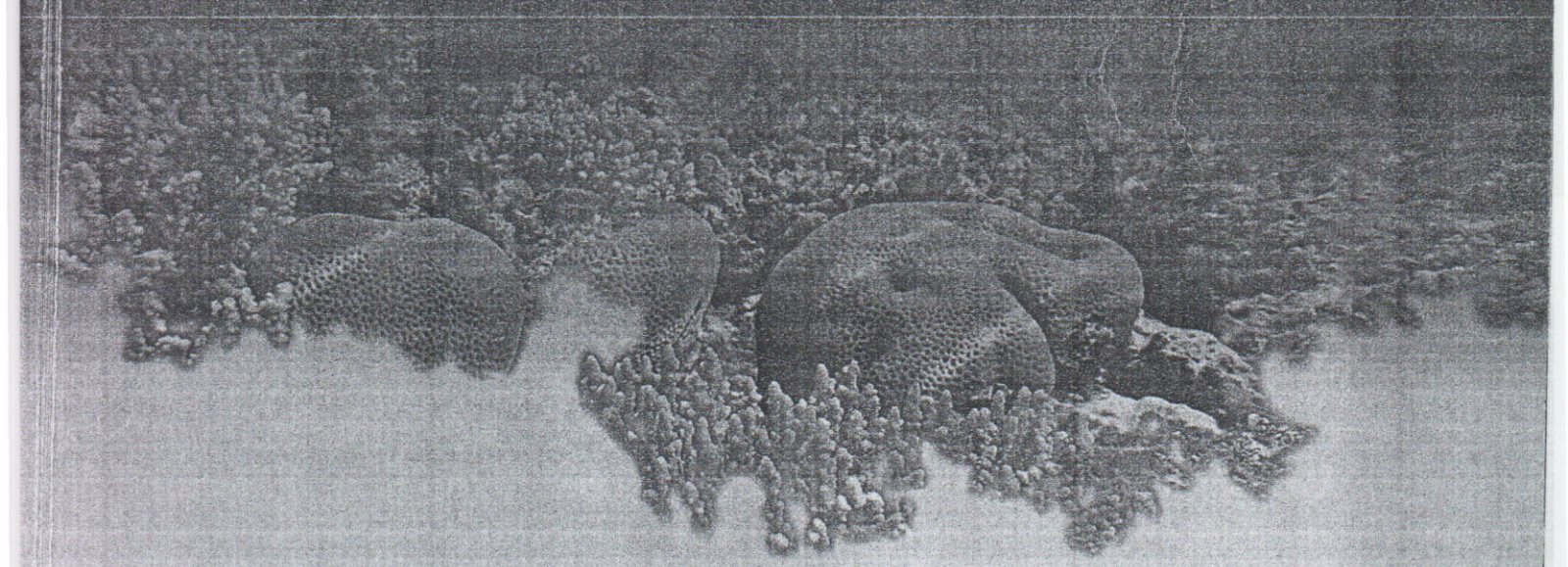

Book of Abstracts

the potential range was -300 to 300 mV. Initially phenol was used as phenolic compound. During the studies of film's formations an increase in each bilayer formed with PAH and Tyr could be observed thus it is concluded that the enzyme's films were deposited and was possible to apply this in a biosensor. An increase in the reduction current with the increase of the phenol concentrations in the electrochemical measurements could be observed which is attributed to efficient catalytic reaction [6]. A calibration curve (with seven points) with r= 0,998 for the concentration range of phenol between 50 μmol/L to 3,5 x 10^{-4} mol/L was obtained. As observed, the biosensor studied exhibits a good potential for detection of phenolic compounds and the layer-by-layer technique seems to be suitable for immobilization of enzymes into the nanostructured thin films. Authors thank also CAPES, CNPq, DQ-UFSCar and Embrapa Instrumentação Agropecuária - Laboratório Nacional de Nanotecnologia para o Agronegócio for the given supports. e-mail: bello@ufscar.br

[1]- Merkoci A., Pumera M., Llopis X., Pérez B., del Valle M., Alegret S.: Trends in Anal. Chem., 24, 9 (2005). [2]- Pérez B., Pumera M., del Valle M., Merkoçi A., Alegret S.: J. Nanosci. Nanotech., 5, 10 (2005). [3]- Adeyoju O., Iwuoka E.J., Smyth M.R., Leech D.: Analyst, 121, 1885 (1996). [4]- Li J., Chia L.S., Goh N.K., Tan S.N.: Anal. Chim. Acta, 362, 203 (1998). [5]- Decher, G., Hong, J.D.: Macromol. Chem. Macromol Symp., 46, 321 (1991). [6]- da Cruz Vieira, I., Fatibello Filho, O.: Anal. Lett., 30 (5), 895 (1997).
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DEVELOPMENT OF SENSORS CONSTRUCTED BY INTERDIGITATED PATTERNS OF GRAPHITE DEPOSITED ON VELLUM PAPER USING SUPERCRITICAL FLUID [RTuM6]

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The development of cheap and disposable sensor technology is considered a important issue since it can be built with low cost and used for many different applications, as for example agriculture, environmental monitoring and medical applications. The line-patterning method with graphite and conductive polymers is a technique that can be useful to be a "throw-away" electronic device, as for example electronic noses, biosensors and electronic tongues. Supercritical CO_2 (SC CO_2) has been extensively studied for chemical reactions, material synthesis and phase separations due to its no toxic characteristic, which minimizes the liquid residues problem. SC CO_2 has low viscosity, high diffusivity and zero surface tension. In this work, sensors were constructed by using interdigitated patterns of graphite [1], deposited on paper and coated with a thin film of polyaniline (PANI) in the emeraldine oxidation state doped with DBSA (dodecylbenzenesulfonic acid) using supercritical fluid. These results were compared with sensor coated with thin film of PANI doped with HCl produced by "in situ" polymerization. The resistance of the sensors was measured in static laboratory air and in flow of dry nitrogen at room temperature, alternatingly, and this procedure was repeated three times during 60 minutes (10 minutes each measurement). According to this procedure, the sensitivity and reprodutibility of each sensor were evaluated. These results showed a different behavior between the sensors obtained by SC CO_2 and "in-situ" polymerization. The resistance measured in the SC CO_2 sensor, when it was exposed into flow dry nitrogen, decreased with the time, and, on the other hand, the opposite effect was observed using the other sensor. It can be verified that both sensors presented good reproducibility (96%) and sensitivity (15.5%) when exposed to the different gaseous conditions. In this way, both sensors can be used to detect volatile organic composites, but the SC CO_2 sensor has demonstrated a longer lifetime than the other sensor. Acknowledgements CNPq, CAPES, FAPESP.

[1] E. C. Venancio, L. H. C. Mattoso, P. S. de P. Herrmann Jr and A. G. MacDiarmid, Sensors and Actuators B: Chemical, 130 (2008) 723.

THE ANION EFFECT IN THE DEVELOPING DISPOSABLE SENSOR USING LINE PATTERNING TECHNIQUE OF GRAPHITE [PTu63]

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The polyanilines is a class of polymer whose bigger difference in relation to other conducting polymers, which is you're doping mechanism [1]. The doping process of the polyaniline does not demand oxidereduction reactions, being enough only to the use of a protonic acid. With this a great variety of acid has been used. Moreover, the counterions, of the dopants, can infer to polymer the capacity to recognize chemical species of interest, as volatile organic compounds (VOCs) and water vapor (relative humidity (RH)), making with that its electric resistance change due to the interaction between the sample. This has been a used strategy in the development of chemical sensors based in polyaniline (PANI) for substances such as ammonia, hydro-carbons, and acetone and also humidity. In comparison with most of the commercially available sensors, based usually on metal oxides and operated at high temperatures, the disposable sensors made of conducting polymers, using line patterning technique [2] have many improved characteristics. They have good sensitivities and short response time; especially, these characteristic are ensured at room temperature. In this work was investigated the influence of different dopants, such as hydrochloric acid (HCl), methanesulfonic acid (MSA), p-toluenesulfonic acid (TSA) and camphorsulfonic acid (CSA) on the electrical properties of sensors made of thin films of polyaniline. These sensors were constructed by using line patterning technique (LPT), to developed interdigitated patterns of graphite deposited on vellum paper and coated with a thin film of conducting polymers. The sensors were coated with thin film of PANI doped with HCl by "in situ" polymerization method, in the emeraldine base. Then, this sensors were dedoped in NH_4Cl 0.1 M solution and then redoped with the desired dopant by anion replacement. The resistance of the sensors was measured in, alternating, static laboratory air (10 minutes) and in flow of dry nitrogen (10 minutes) at room temperature, repeating this procedure three times. According to this procedure, the sensibility (S %) and reversibility (n %) of each sensor were evaluated, whose results are listed in the Table I. Can be observed that was obtained an excellent reversibility

to all sensors evaluated. The results showed how the dopants have an important rule in the development of disposable sensor. In this investigations was used a flow of dry nitrogen, to evaluate the response to water vapor. It can be noted that the initial responses to flow of dry nitrogen was very rapid. Acknowledgements CNPq, CAPES, FAPESP.

	Pani-HCl	Pani-MSA	Pani-TSA	Pani-CSA
S (%)	17	10	7.7	18
η (%)	95	98	100	100

[1] A.G. MacDiarmid, Synthetic Metals, 84 (1997) 27. [2] E. C. Venancio, L. H. C. Mattoso, P. S. de P. Herrmann Jr and A. G. MacDiarmid, Sensors and Actuators B: Chemical, 130 (2008) 723.

DEVELOPMENT OF ELECTROCHEMICAL BIOSENSOR BASED ON LECTIN AND POLYVINYL BUTYRAL FOR EVALUATION OF SERUM GLYCOPROTEINS FROM PATIENTS INFECTED BY DENGUE [PTh56]

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Biosensors are great interesting because of their potential utility as specific, simple, label-free and direct detection techniques and reduction in size costs and time of analysis compared with conventional bioassay techniques. In the present work, we have introduced a novel approach for fabrication of biosensor based on immobilization on electrode surface modified with gold nanoparticles (nanoAu) and polyvinyl butyral (PVB) nanoAu-ConA-PVB. This system was applied as a biosensor to glycoproteins serum (GS) from patients infected by dengue fever (DF) and dengue hemorrhagic fever (DHF). Electrochemical impedance spectroscopy (EIS), in the frequency range from 100 mHz to 100 KHz, and cyclic voltammetry (CV), from -0.2 to 0.7 V, were performed, in phosphate buffer (PBS) solution containing 10 mM $K_3[Fe(CN)_6]/K_4[Fe(CN)_6]$ (1:1) mixture as a redox probe. In the EIS study, an obvious difference of the electron transfer resistance between the nanoAu-ConA-PVB-BSA and nanoAu-ConA-PVB-BSA-GS (DF or DHF) modified electrodes were observed. The impedance spectra showed an increase in the charge transfer resistance when ConA interacted with GS. The cyclic voltammogram tends to be more irreversible with gradual increase of adsorption on the electrode surface. The resulting biosensor exhibited different interactions to DF and DHF.

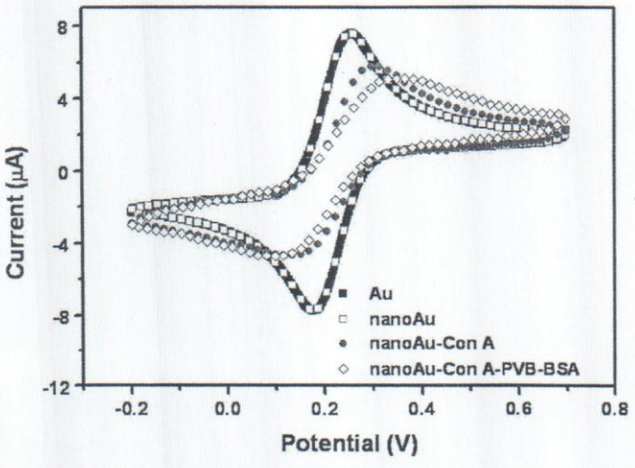

Figure 1- Cyclic voltammograms (CVs) of the electrode at different stages. Supporting electrolyte 10 mM $K_4[Fe(CN)_6]/K_3[Fe(CN)_6]$ 1:1 + 0.15 M NaCl in 10 mM pH 7.4 solution; scan rate, 50 $mV.s^{-1}$.

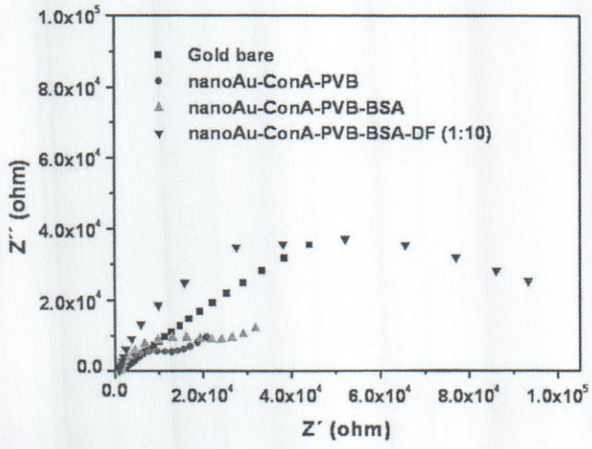

Figure 2- The impedance spectra were taken in 10 mM $K_4[Fe(CN)_6]/K_3[Fe(CN)_6]$ 1:1 + 0.15 M NaCl in 10 mM pH 7.4 in the frequency range from 100 mHz to 100 kHz.