Poster Session 2 (TPS2): Tuesday 3/18/14 16:30 - 18:00 hs [Meeting Point]

Poster	Title	Topic	Author Name	Abstract	University/Company	Countries
TPS-T1-1	**Differential Pulse Voltammetry (DPV) Used to Electrochemically Measure Nitrite and Interfering chemicals by means Au Electrodes Recovered with 1,2-cis-Diaminobenzene**	# 1 Chemical and Biochemical Sensors	**Fernando Luis de Almeida, Sebastião Gomes dos Santos Filho**	This paper describes the Differential Pulse Voltammetry (DPV) employed to measure nitrite concentrations in physiological serum in presence of some interfering chemicals such as Uric Acid, Ascorbic Acid and Paracetamol at upper concentrations as found in human blood. The DPV measurements were performed with the aid of gold macroelectrodes (4.5 ± 0.2 mm2) recovered with 1,2- cis-Diaminobenzene (1,2-cis-DAB) to reduce the influence of the interfering chemicals in the nitrite measurement, ensuring good baseline, selectivity, linearity, stability, repeatability, reproducibility and sensitivity. In addition, the responses to electrochemical potentials were obtained for different chemical concentrations at the maximum DPV current.	University of São Paulo, Escola Politécnica, São Paulo, SP, Brazil	Brazil
TPS-T1-10	**Nanostructured ZnO/SnO_2 gas sensors via microemulsion synthesis method**	# 1 Chemical and Biochemical Sensors	**Fahimeh Hoori-Abad Saboor, Mehrdad Asgari, Yadollah Mortazavi, Abbas Ali Khodadadi**	Heteronanostructures of ZnO/SnO2 was synthesized through two different synthesis procedures in microemulsion system of TritonX-100/hexanol/cyclohexane. Response of these nanoparticles to CO, CH4 and EtOH was measured and compared with bare ZnO nanoparticles. Different sensing behavior was observed when Sn precursor was added sequentially to a microemulsio of ZnO nanoparticles (ZS1) than coprecipitation of Zn and Sn in the microemulsion (ZS2). For all gases, a decrease in Tmax was observed for ZS1 compared to the bare ZnO. Moreover, the responses to CO and CH4 were considerably higher for ZS1 than ZS2. The obvious difference in the BET surface area of ZS1(56 m2/gr), ZS2(132 m2/gr) and ZnO (36 m2/gr) nanoparticles, show significant changes in nucleation/growth mechanism of SnO2 nanoparticles in two procedures.	Catalysis and Nanostructured Materials Research Laboratory, School of Chemical Engineering, University of Tehran, Tehran, Iran	Iran
TPS-T1-11	**Fabrication of an electrochemical immunosensor for detection of CEA based on protein A - Au nanoparticle modified gold electrode**	# 1 Chemical and Biochemical Sensors	**Jie Zhou, Liping Du, Ling Zou, Yingchang Zou, Ning Hu , Kaiqi Sua, Ping Wang** *presenter is Jie Zhou*	The fabrication of Staphylococcal protein A (SPA) film on Au nanoparticle (AuNPs)-modified electrode was done for the construction of electrochemical immunosensor. In this work, a highly sensitive electrochemical immunosensor for the detection of a tumor biomarker, carcinoembryonic antigen (CEA) was developed by absorption of anti-CEA antibodies on the protein A-modified nanoscale gold electrode. Electrochemical impedance spectroscopy (EIS) and cyclic voltammetry (CV) techniques were employed in determination of electrode responses and applicability. Under the optimized condition, the anti-CEA antibody-protein A modified nanoscale gold electrode displays a good linear response to CEA with a range from 1 pg/ mL to 100ng/ml and a detection limit of 0.1pg/ml. Furthermore, samples of 1~10ng/ml CEA in rat serum was detected with the immunosensor and the immunosensor showed acceptable recoveries. It can be concluded that the immunosensors provide a promising ultrasensitive immunology strategy for clinical diagnosis.	Biosensor National Special Laboratory, Key Laboratory for Biomedical Engineering of Education Ministry, Department of Biomedical Engineering, Zhejiang University, Hangzhou, China,310027	China
TPS-T1-12	**Metal Oxides/ RGO Chemically Modified GCE for Fast Determination of PCBs though Electrochemical Methods**	# 1 Chemical and Biochemical Sensors	**Yesheng Li, Zilong Tang*, Zhongtai Zhang**	A flexible and simple method is studied to determine persistent toxic substances (PTS), especially PCBs. We report a kind of novel electrochemical method through testing cyclic voltammetry (CV) to detect PCBs. Two special structures of Cu2O,TiO2-graphene oxide (TiO2-GO) composites and reduced graphene oxides (RGO) are synthesized and used to modify glass carbon electrodes (GCE) .The modified electrodes are studied to determine the concentration of PCBs, and we find that they can effectively improve the sensitivity of GCE. The as-prepared Cu2O modified GCE exhibits excellent properties with the increasing current about 8 times compared with other modified GCE.	State key Laboratory of New Ceramics and Fine Processing, School of Materials Science and Engineering, Tsinghua University, Beijing 100084, China	China
TPS-T1-13	**Selective detection of unburned-hydrocarbon in the exhaust gas using catalytic filter**	# 1 Chemical and Biochemical Sensors	**Mohammad Hossein Saberi[1], Yadollah Mortazavi[1], Abbas Ali Khodadadi[2]**	We used Pd/LaMnO3 as a catalytic filter for Pt/SnO2 sensor to selectively detect propane, as a representative of unburned-hydrocarbons, in the presence of CO and NO for exhaust gas application. SnO2 was synthesized by a sol–gel method and LaMnO3 was prepared through a combustion synthesis method. The samples were impregnated with aqueous solutions of H2PtCl6 and Pd(NO3)2.2H2O to get 1.0 wt% Pt/SnO2 and 1.0 wt% Pd/LaMnO3. By using Pd/LaMnO3 filter, the fabricated sensor responded to propane similar to a mixture of CO, NO and C3H8. Thus, the combination of Pd/LaMnO3 filter and Pt/SnO2 sensor becomes highly selective to propane in the presence of CO and NO in the exhaust stream of a gasoline engine.	1.School of Chemical Engineering, College of Engineering, University of Tehran, Tehran, Iran	Iran
TPS-T1-14	**Detection of low concentration-chlorinated VOC using SnO2-based semiconductor thick film gas sensors**	# 1 Chemical and Biochemical Sensors	**Sahar Vahdatifar[1], Hamide Mohammad Aliha[1], Abas ali Khodadadi[1], Yadollah Mortazavi[2]**	The sensing materials based on tin oxide were synthesised via sonication assisted deposition/precipitation method. The gas sensing measurments of the fabricated sensors to 1 ppm dichloromethane (DCM) were carried out in the temperature range of 200–400°C. The metal oxide additives such as 5.0 wt %WO3, 0.05wt% CNT and 1.0 wt% Pt, Au and ZnO were utilized. Sn02 based nanomaterials were characterized by XRD, BET surface area, and TEM. It was found that the addition of WO3, Au, Pt and CNT had positive effect on the sensitivity of pure SnO2, while the sensitivity supressed by addition of ZnO. Among all the dopants, 5.0 wt % of WO3 enhanced the sensitivity more significantly; on the other hand it increased the optimum operating temperature to 300ºC.	1.School of Chemical Engineering, College of Engineering, University of Tehran, Tehran, Iran 2.Nanoelectronics Centre of Excellence, University of Tehran, Tehran, Iran	Iran
TPS-T1-15	**Fabrication and characterization of SnO_2 gas sensors based on micro-hotplate**	# 1 Chemical and Biochemical Sensors	**Meihua Li, Welping Yan, Zhenya Guo, Zhenan Tang.**	A coating method named "Deposition by Droplet Guide" (DDG) was presented for the first time to deposit gas sensitive material onto the 60μm×60μm active area of micro-hotplate to fabricate the low-power consumption gas sensors. To improve the sensitivity and selectivity of gas sensors, pure SnO2 and SnO2 doped with TiO2 and carbon nano-tube (CNT) were developed as the sensing material, respectively. To choose the optimal operation conditions, many experiments were executed to determine the operation voltage and heat treatment temperature. A dynamic detection system based on MSP430 micro-controller was designed to process the data.	School of Electronic Science and Technology, Dalian University of Technology, Dalian 116023, China	China
TPS-T1-16	**Low Power Consumption Micro Alcohol Gas Sensor based on Micro-heater and Ink jetting Technology**	# 1 Chemical and Biochemical Sensors	**S. E. Moon, H-K. Lee, N-J. Choi, J. Lee, W. S. Yang, and J. K. Kwon**	Micro volatile alcohol gas sensor was fabricated based on micro-heater using indium oxide nano-powders with low power consumption and high sensitivity. Based on semiconducting In2O3 thick film, to increase the sensitivity for alcohol gas rare metal dopants were added. In the structure of micro-heater, two semi-circled Pt heaters, where some etching holes exist, are connected to the spreader for thermal uniformity and reduction of the Si etching time. Based on the above design, low power consumption alcohol gas sensor was fabricated by using CMOS compatible MEMS process. Micro gas sensor showed substantial sensitivity down to 0.05ppm alcohol at low power consumption (24mW).	ETRI, Gajeong-dong, Yuseong-gu, Dejeon 305-700, Korea	Korea
TPS-T1-17	**A fiber Bragg grating sensor for hydrogen leakage detection based on catalytic oxidation heat**	# 1 Chemical and Biochemical Sensors	**Satoshi Masuzawa[1], Shinji Okazaki[1], Maru Yusuke[2], Tadashi Mizutani[2]**	A fiber optic hydrogen gas sensor using platinum catalyst dispersed in silicon dioxide support was developed. This sensor is a kind of combustion-type gas sensor. The temperature change was converted into a reflected wavelength shift on fiber Bragg gratings. The sensitive material was prepared by sol-gel method. Two types of structures in which the sensitive film was deposited on a quartz glass substrate or a periphery of the optic fiber were fabricated. In the substrate-type sensor, the sensor was able to respond to low concentration of H2 under 0.4 vol.% in air within 240 seconds at room temperature . In the other type, the sensor achieved fast response to 1 vol.% H2 in air in less than 30 seconds.	1 Yokohama National University, Faculty of Engineering 79-5 Tokiwadai, Hodogaya-ku, Yokohama-city 240-8501, Japan 2 Japan Aero Space Exploration Agency, Institute of Space and Astronautical Science, 3-1-1 Yoshinodai, Sagamihara, 229-8510, Japan 3 Japan Aero Space Exploration Agency, Tsukuba Space Center, 2-1-1 Sengen, Tsukuba, 305-8505, Japan	Japan
TPS-T1-18	**Preparation of novel TiO_2/Graphene@conducting polymer- Au nanoflower hybrid for the fabrication of ultra-sensitive electrochemical nitrite biosensor**	# 1 Chemical and Biochemical Sensors	**G. Sai-Anand[1], H.-G. Lee[2], A.-I. Gopalan[2], K.-P.Lee[2], S.-W. Lee[1], Md. R.-R. Khan[1], H.-M. Jeong[1], J.-S. Lee[1] and S. W. Kang[1]***	A new multi-component nano-architectured hybrid, graphene incorporated TiO2 nanowire decorated with conducting polymer supported gold nanoflowers (TiO2/G NW@CP-Au NF) was successfully prepared and utilized as the platform for enzyme immobilization and fabrication of an ultra-sensitive electrochemical nitrite biosensor.	1.School of Electronics Engineering, Kyungpook National University, Daegu 702-701, South Korea 2.Department of Nano-science & Technology, Kyungpook National University, Daegu 702-701, South Korea 3.Research Institute of Advanced Energy Technology, Kyungpook National University, Daegu 702-701, South Korea 4.Department of Chemistry Education, Kyungpook National University, Daegu 702-701, South Korea	South Korea
TPS-T1-19	**A Two-Dimensional Golden Microelectrode Array with Plating Bismuth for Heavy Metals Determination**	# 1 Chemical and Biochemical Sensors	**Qiyong Sun[1], Hao Wan[1], Haibo Li[1], Ning Xu[1] and Ping Wang[1]***	Contamination of aquatic environment by heavy metals,which can do harm to the whole ecological systems ,gets more and more serious with the rapid development of industry. Meanwhile, environmentally friendly analytical methods and alternative materials are developing rapidly[1] with the increase of people's environmental awareness. This paper describes a 2-D golden microelectrode array(Au-MEA) , which consisted of 36 gold microdiscs on the surface and was used for heavy metals detection with plating bismuth. Au-MEA is fabricated based on the standard microfabrication technology and was observed by optical microscope after bismuth electroplating. The analytical performance of the array was investigated by differential pulse anodic stripping voltammetry (DPASV), and detection limits below μg.L-1 level were obtained for lead and copper ions(Pb2+ and Cu2+). This paper proposed a 2-D bismuth-coated golden microelectrode array, offering a potential to replace toxic mercury used most frequently for determination of heavy metals (Pb,Cu).	1 Biosensor National Special Laboratory, Key Laboratory of Biomedical Engineering of Education Ministry, Department of Biomedical Engineering, Zhejiang University, Hangzhou, China	China
TPS-T1-2	**Fabrication of Tin Oxide Pellets for sensing CO and C3H8**	# 1 Chemical and Biochemical Sensors	**M. de la L. Olvera, T.V.K. Karthik, A. Maldonado**	Tin oxide (SnO_2) powders were obtained by the homogeneous precipitation method from a 0.4 M starting solution prepared from Tin chloride and Urea as a precipitation agent. The SnO_2 powders were ball milled at 4, 6 and 8 h and two different speeds, 300 and 400 rpm. Further, the powders milled at 400 rpm for 6 h were put in a stainless steel die and pressed with a pressing machine to manufacture the pellets . After several experimental trials stable SnO_2 pellets were formed by pressing with 16 tons for 90 min. The sensing properties of these pellets were measured at different carbon monoxide (CO) and propane (C_3H_8) concentrations and operation temperatures.	Departamento de Ingeniería Eléctrica, Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, CINVESTAV-IPN, SEES, Apartado Postal 14740, México, D.F., 07000, MEXICO	México
TPS-T1-20	**X-ray efficiency of LuPO4:Eu nanophosphor screens**	# 1 Chemical and Biochemical Sensors	**I. E. Seferis[1], C. M. Michail[2], J. Zeler[2], I. G. Valais[3], P. F. Liaparinos[2], N. I. Kalyvas[3], G. P. Fountos[3], , A. Bakas[4], I. S. Kandarakis[3], E. Zych[2]**	The purpose of the present study was to experimentally evaluate the light emission efficiency of a 32.4 mg/cm2 Europium doped Lutetium orthophosphate (LuPO4:Eu) powder phosphor screen, consisting of crystallites up to 500 nm, under radiographic imaging conditions. Parameters such as the Absolute Efficiency (light energy flux over exposure rate) and the spectral Matching Factor (the emitted light spectral compatibility to various electronic photodetectors) were evaluated. Results showed that the absolute efficiency of LuPO4:Eu phosphor screen decreased with x-ray tube voltage. The emission spectrum of the examined scintillator is well matched with the spectral sensitivities of many optical photon detectors often employed in radiation detectors [1]. Taking these results into account LuPO4:Eu phosphor could be considered as a potential candidate for use in x-ray medical imaging.	1Department of Medical Physics, Medical School, University of Patras, 265 00 Patras, Greece 2Faculty of Chemistry, Wroclaw University, 14F Joliot-Curie Street, 50-383 Wroclaw, Poland 3Department of Biomedical Engineering, Technological Educational Institute of Athens, 12210 Athens, Greece 4Department of Medical Radiological Technology, Technological Educational Institute of Athens, 12210 Athens, Greece	Greece, Poland
TPS-T1-21	**A label - free electrochemical DNA aptasensor for the detection of dopamine**	# 1 Chemical and Biochemical Sensors	**Marta Jarczewska, Łukasz Górski, Elżbieta Malinowska**	The aim of the presented work was the examination of the possibility of use of DNA aptamer as the receptor layer in the biosensor for the determination of dopamine (DA). The proposed aptasensor operates via specific interaction between aptamer sequence immobilized on the gold disk electrode and dopamine. DA was detected without use of any external redox label by the voltammetric analysis of dopamine oxidation current, which was proportional to the dopamine concentration in the range from 0.05 to 1 mM. This label – free assay exhibited high selectivity towards dopamine and the presence of other interferents had a negligible influence on biosensor's response. The calculated limit of detection for the aptasensor was of 21.6 μmol L-1.	Warsaw University of Technology, Faculty of Chemistry, Department of Microbioanalytics, Noakowskiego 3, 00-664, Warsaw, Poland	Poland
TPS-T1-22	**Analysis of palladium and yttrium-palladium alloy layers used for hydrogen detection with SAW device**	# 1 Chemical and Biochemical Sensors	**Meddy VANOTTI[1], Virginie MOUTARLIER[2], Sylvain BALLANDRAS[3], Virginie BLONDEAU-PATISSIER[3]**	For an increasing number of application (energy production, car industry, space, etc.), hydrogen appears as a solution of the future. However, due to its unstable properties, a particular care must be dedicated to control gaseous leaks close to facilities using this resource. SAW sensors consisting in Rayleigh-wave delay lines equipped with a palladium sensitive overlay allow for detecting hydrogen. In this paper we propose a surface acoustic wave devices for the detection of hydrogen in standard environmental conditions. An X-ray diffraction (DRX) analysis of palladium and yttrium-palladium alloy sensitive media will also be shown. The SAW devices have been manufactured using different palladium thicknesses and permit to detect and measure hydrogen concentrations in the 0.25-2% range diluted in nitrogen.	1 Time and Frequency department, FEMTO-ST Institute, 26 Chemin de l'Epitaphe - 25030 Besançon cedex, France 2 UTINAM Institute, UFR Sciences & Techniques, 16 route de Gray- 25000 Besançon, France 3 frec|n|sys SASU, 18 rue Alain Savary - 25000 Besançon, France	France

TPS-T1-23	**Contactless Conductivity Microdetector With Four Electrodes In 3D Design**	# 1 Chemical and Biochemical Sensors	**Karolina Maciejewska, Kamil Zukowski, Michał Chudy, Zbigniew Brzozka, Artur Dybko**	We present a new four electrode contactless conductivity detector for microfluidic system. The presented microdetector was made in poly(methyl methacrylate) using a micromilling technology. In the reported microdetector, the microchannels filled with eutectic solution (Aldrich, Gallium-Indium eutectic, ≥99.99% trace metal basis) act as electrodes (called pseudoelectrodes). The microdetector consist of four layers. In the presented design, all electrodes are arranged around the microchannel. In the three lower plates (a thickness of 400 μm) microchannels were micromilled, the fourth plate (a thickness of 5 mm) was used to seal and bring the inlet and outlet tubes. All plates were thoroughly cleaned, dried and then bonded thermally. Analyte was pumped into microchannels using a syringe pump.	Department of Microbioanalytics, Faculty of Chemistry, Warsaw University of Technology	Poland
TPS-T1-24	**Effects of metal nanoparticles functionalization on tin oxide nanowires gas sensors**	# 1 Chemical and Biochemical Sensors	**C. Cerqui[a], A. Ponzoni, D. Zappa, E. Comini, M. Ferroni, G. Faglia and G. Sberveglieri**	Chemiresistors based on metal oxide (MOX) have been widely used in gas sensing, in particular, tin oxide is a material largely studied for its sensitivity towards different gases. Its functionalization with metallic nanoparticles is a well-established method in thin and thick film technology to address specific sensitivity. The goal of this work is to develop the metal functionalization approach in metal oxide nanowires, synthesized via vapor-liquid-solid technique. Their behavior can be modulated functionalizing with noble metals (Au, Pd, Cu) deposited as nanoparticles by RF magnetron sputtering. The use of these metals as catalyst increases the sensor response to specific gases at different operative temperature. For example, the functionalization with copper revealed effective in the hydrogen sulphide detection in nanowire technology too.	University of Brescia- Via Valotti, 9 – Brescia - ITALY	Italy
TPS-T1-25	**Electrospun tin oxide nanofibers as sensors for security applications**	# 1 Chemical and Biochemical Sensors	**D. Matatagui[1] , J.P. Santos[1], M.J. Fernández[1], J. Fontecha[1], I. Gràcia[2], C. Cané[2], M.C. Horrillo[1]**	A new method of depositing tin dioxide nanofibers in order to develop chemical sensors is presented. It involves an electrospinning process with in-plane electrostatic focusing over micromechanized substrates. It is a fast and reproducible method. After an annealing process, which can be performed by the substrate heaters, it is observed that the fibers are intertwined forming porous networks that are randomly distributed on the substrate. The fiber diameters oscillate from 100 to 200 nm and fiber lengths reach several tens of microns. Each fiber has a polycrystalline structure with multiple nano-grains. The sensors have been tested for the detection of low concentrations of acetone and hydrogen peroxide, precursors of triacetone triperoxide (TATP) used in improvised explosive devices (IEDs).	1 GRIDSEN, Instituto de Seguridad de la Información, CSIC, Serrano 144, 28006 Madrid, Spain 2 Instituto de Microelectrónica de Barcelona, CSIC, Campus UAB, 08193 Bellaterra, Spain	Spain
TPS-T1-26	**Hydrogel sensor solution for the selective concentration monitoring of divalent metal ions**	# 1 Chemical and Biochemical Sensors	**Dipl.-Ing. Markus Windisch[a]; Dipl.-Chem. Thomas Junghans[a]**	Based on a proven design a novel industrial-suited hydrogel sensor solution for the selective concentration monitoring of divalent metal ions has been developed and investigated. For the first time approximately 300 nm thick films of a PNIPAAm hydrogel functionalized with a crown-ether moiety were coated and thermally cross-linked on a piezo-electric thickness shear resonator (TSR). The sensor exhibits response times of less than 15 seconds and a 30 times higher sensitivity to Barium than to Sodium. It provides a reproducible concentration curve and can be regenerated in DI-water.	a Institute of Electromechanical and Electronic Design, Dresden University of Technology, D-01062 Dresden, Germany b Department of Chemistry, Physical Chemistry of Polymers, Dresden University of Technology, D-01062 Dresden, Germany	Germany
TPS-T1-27	**Response enhancement of TiO2 nanocrystal sensors by vanadium oxide surface functionalization: beyond conventional doping**	# 1 Chemical and Biochemical Sensors	**Mauro Epifani[a], Elisabetta Comini[b], Raül Díaz[c], Carmen Force[d], Reza Zamani[e,f], Jordi Arbiol[e,g], Teresa Andreu[a], Pietro Siciliano[a], Guido Faglia[b], Joan R. Morante[a,b]**	TiO2 anatase nanocrystals were prepared by sol-gel process and solvothermal treatment at 250 °C. Vanadium precursor could be easily added before the solvothermal step. Through extensive material characterization work, the presence of dense V2O5 layer onto the surface of anatase nanocrystals was ensured, without any phase separation even after heating the materials at 400 °C. These organics free, phase stabilized 400 °C materials were used for preparing chemoresistive sensors. Various gases were tested, such as ethanol, demonstrating that the V surface modification enhanced the sensor response by up to two orders of magnitude. These results introduce an alternative concept of additives, which act as a sort of surface antenna amplifying the material-analyte reaction, resembling the well-known TiO2-supported V2O5 catalyst.	a.Consiglio Nazionale delle Ricerche – Istituto per la Microelettronica e Microsistemi (CNR-IMM), Lecce (Italy); b.SENSOR Lab, Department of Information Engineering, Brescia University and CNR-IDASC, Brescia, Italy; c.Electrochemical Processes Unit, IMDEA Energy Institute, Móstoles, Spain; d.NMR Unit,Centro de Apoyo Tecnológico, Universidad Rey Juan Carlos, c/Tulipán, s/n, 28933 Móstoles, Spain; e.Institut de Recerca en Energia de Catalunya (IREC), Barcelona, Spain; f.Institut de Ciència de Materials de Barcelona, ICMAB-CSIC, Bellaterra, Spain; g.Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain; h.Departament d'Electrònica, Universitat de Barcelona, Barcelona, Spain;	Italy, Spain
TPS-T1-3	**Electrochemical Sensor Based on Poly[Ni(Schiff)] Nanowires With Active Heads of Oxide Nickel for Ethanol Electrooxidation**	# 1 Chemical and Biochemical Sensors	**A. Olean-Oliveira[1], W. B. S. Machini[1], A. C. D. Angelo[2] and M. F. S. Teixeira[1]**	Electrocatalytic oxidation of ethanol on a platinum modified electrode with a nanowires based on poly[Ni(Schiff)] was studied by cyclic voltammetry in alkaline medium. The poly[Ni(Schiff)] nanowires was obtained via electropolymerization using cyclic voltammetry. After, the modified electrode was submitted to potential scans in NaOH 0.1 mol L-1, obtaining active heads of oxide nickel on the nanowires surface. The average surface coverage of 1.65 × 10-9 mol cm-2 was calculated. The anodic peak current of sensor was linearly dependent on the ethanol concentration in the response range of 1.49 × 10-6 to 6.47 × 10-6 mol L–1 in 0.1 mol L–1 NaOH solution with a detection limit of 4.71 × 10-5 mol L–1.	1. Department of Physics, Chemistry and Biology, Faculty of Science and Technology, São Paulo State University (UNESP), Roberto Simonsen Street, 305, Postcode 19060-900, Presidente Prudente, SP, Brazil . 2. Department of Chemistry, Faculty of Science, São Paulo State University (UNESP), Engenheiro Luis Edmundo Carrijo Avenue, 14-01, Postcode 17033-360, Bauru, SP, Brazil.	Brazil
TPS-T1-4	**Formation of poly(thionine) polymeric thin films on the FTO surface and its application as a sensor for promethazine**	# 1 Chemical and Biochemical Sensors	**D. Albuquerque-Rosa, D. N. David-Parra, W. B. S. Machini and M. F. S. Teixeira**	A polymeric thin film of poly(thionine) was prepared by electropolimerization using cyclic voltammetric in acidic conditions on fluorine doped tin oxide (FTO) conductive electrode for electroanalytical quantification of promethazine hydrochloride (PMZ). After characterization and optimization of kinetics parameters, the electrochemical sensor based on poly(thionine) was applied to determination of PMZ using cathodic stripping by linear sweep voltammetry. The electrochemical sensor for PMZ exhibited linear response in the concentration range of 3.0 x 10-5 to 5.0 x 10-4 mol L-1 with detection limit of 3.0 x 10-6 mol L-1.	Department of Physics, Chemistry and Biology, Faculty of Science and Technology, São Paulo State University (UNESP), Roberto Simonsen Street, 305, Zip Code 19060-900, Presidente Prudente, SP, Brazil.	Brazil
TPS-T1-5	**Hydrogen peroxide electrochemical sensor based on nickel-salpn polymeric film modified electrode**	# 1 Chemical and Biochemical Sensors	**D. N. David-Parra, W. B. S. Machini, E. T. G. Cavalheiro and M. F. S. Teixeira**	A novel electrochemical sensor based on nickel-salpn polymeric film modified electrode was constructed for the determination of hydrogen peroxide (H2O2). The [Ni(salpn)] polymeric film was obtained via electropolymerization using cyclic voltammetry. After, the modified electrode was submitted to potential scans in 0.5 mol L-1 KCl until its stabilization. The determination of hydrogen peroxide was studied by linear sweep voltammetric using the standard addition method, observing the increase of current of peak cathodic. The linear range for the detection of H2O2 was from 4.99 × 10−5 to 2.44 × 10−3 mol L-1 with a calculated limit of detection of 7.68 × 10−6 mol L-1. This work reports on the application of a modified electrode as voltammetric sensor for hydrogen peroxide determination.	Department of Physics, Chemistry and Biology, Faculty of Science and Technology, São Paulo State University (UNESP), Roberto Simonsen Street, 305, Zip Code 19060-900, Presidente Prudente, SP, Brazil.	Brazil
TPS-T1-6	**Development of isoborneol molecularly imprinted polymer based sensor**	# 1 Chemical and Biochemical Sensors	**G.S. Braga[1,2], F. Bates[2], F. J. Fonseca[2], L.H.C. Mattoso[1], M. del Valle[3]**	A molecularly imprinted polymer (MIP) impedance-based sensor to detect isoborneol (ISO) was prepared by polymerizing a sensitive layer using precipitation technique over an ITO electrode. To evaluate its sensitivity and imprinting efficiency, impedance measurements were performed using MIP and NIP (reference non-imprinted polymer) sensors in a 1mM diluted solution of ISO prepared with distilled water. MIP showed higher relative sensitivity (236.94%) to ISO than the NIP (53.74%), and a mean imprinting efficiency of 4.4. In addition, sensors' electrical response (resistance) exhibited good stability over time. Results obtained demonstrate the efficiency at imprinting cavities at polymer structure and the promising use of the precipitation technique to fabricate MIP based sensors.	1 EMBRAPA Instrumentação, CEP: 13560-970, São Carlos, SP, Brazil 2 Escola Politécnica da Universidade de São Paulo, CEP: 05508-900, São Paulo, SP, Brazil 3 Sensors and Biosensors Group, Universitat Autònoma de Barcelona, 08193, Bellaterra, Spain	Brazil, Spain
TPS-T1-7	**Automated real-time SPR immunosensor with combined angular and spectral detection**	# 1 Chemical and Biochemical Sensors	**M. Cocco[1,*], B. Auguié[1], N. G. Tognalli[2], M.A. Daza Millone[3], M.E.Vela[3], R. C. Salvarezza[3], M. Rumbo[4], G.H. Docena[4], J. Montoya[5], A. Fainstein[1]**	We describe a fully self-contained and automated portable SPR immunosensor designed for real-time analysis of low-molecular-mass analytes in natural water samples, and operative in a combined angular and spectral detection scheme. The formation of an alkanethiol self-assembled monolayer allows the automated regeneration and repeated use of the same sensor surface. The system integrates the control of pumps and valves for sample injection and substrate regeneration. The device is tested with the model system dinitrophenol-anti-dinitrophenol in a competitive scheme, and the relative sensitivity of the angular and spectral approaches is assessed.	1. CAB-IB, Comisión Nacional de Energía Atómica, 8400 S. C. de Bariloche, Río Negro, Argentina. 2. CITES, Ruta Nac. 34 km 257, 2322 Sunchales- Santa Fe. 3. INIFTA (CONICET-UNLP) CC16 Suc4 /1900) La Plata, Argentina. 4. IIFP (CONICET-UNLP), La Plata, Argentina. 5. EEA Anguil (INTA), Ruta Nac. Nº 5 km 580, CC 11 (6326) Anguil, La Pampa..	Argentina
TPS-T1-8	**Studying the binding kinetics of an antigen- antibody model system by Surface Plasmon Resonance: towards the development of a biosensor**	# 1 Chemical and Biochemical Sensors	**C.Y.Chain[1], M.A.Daza Millone[1,*], E.A.Ramirez[1], M. Rumbo[2], G.H. Docena[2], M.E.Vela[1]**	We have studied the casein-anti-casein binding kinetics using two different strategies in an Surface Plasmon Resonance commercial device: i) casein was immobilized onto the solid phase and assessed with a mouse monoclonal antibody specific to bovine casein at different concentrations in solution and ii) the solid substrate was coated with the anti-casein monoclonal antibody and the binding to different concentrations of soluble casein was assessed.	1. INIFTA (CONICET-UNLP) CC16 Suc4 /1900) La Plata, ARGENTINA 2. IIFP (CONICET-UNLP), La Plata, ARGENTINA.	Argentina
TPS-T1-9	**A Novel Inkjet Printed Surface Enhanced Raman Spectroscopy (SERS) Substrate Based on Marangoni Effect for the Detection of Heavy Metal Compounds**	# 1 Chemical and Biochemical Sensors	**Morteza Rezaei, Ali Eshkeiti, Payam Aminayi, Zeinab Ramshani, Binu B. Narakathu, Massood Z. Atashbar**	A novel surface enhanced Raman spectroscopy (SERS) substrate was fabricated by inkjet printing laboratory synthesized silver neodecanoate on two different substrates (Mitsubishi paper (NB-RC3GR120) and polyethylene terephthalate (PET)). A uniform particle distribution was achieved by overcoming the coffee stain phenomena using Marangoni effect while sintering. In addition, the nanoporous feature of the silver neodecanoate provided a rough metallic surface which increased the probability of the presence of "hot spots" in the SERS substrate. The functionality of the printed device to be used as a SERS substrate was demonstrated through the detection of toxic heavy metal compounds. An enhancement factor of five orders of magnitude, in the intensity of the Raman spectra, was achieved for mercury sulphide (HgS) on the printed substrate when compared to that of HgS on bare PET. The response of the printed SERS substrate is analyzed and presented in this paper.	Western Michigan University, 4601 Campus Drive, Kalamazoo, Michigan 49008, USA	USA
TPS-T2-1	**PANi/FTO film with changed sensitivity for chemical pH sensor in the differential mode of operation**	# 2 Technologies for Chemical and Biochemical Sensing	**Hugo José Dias Mello, Tobias Heimfarth, Jessica Colnaghi Fernandes, Marcelo Mulato**	In the differential mode of operation, EGFET ions sensors are more reliable and stable due to its attenuated sensitivity to temperature, light and time. The differential ion sensor has a principal electrode and a contrast electrode with a desirable large difference of pH sensitivity to provide an appreciable output but keeping the response to other factors unchanged. Fluorine-doped tin oxide (FTO) and titanium oxide (TiO2) films can be used as ion sensors. We managed to increase FTO films sensitivity by electrodepositing a polyaniline (PANi) layer on top of it. The novel film sensitivity is up to 1.6 times greater than for FTO.	Universidade de São Paulo, FFCLRP, Departamento de Física – DF, SP, Brazil	Brazil
TPS-T2-2	**Influence of the oxygen partial pressure in the process of ZnO films preparation on biological protein adsorption for SAW biosensors**	# 2 Technologies for Chemical and Biochemical Sensing	**Qiuyun Fu, Jianfeng Deng, Dongxiang Zhou, Shuping Gong ,Junyong Xie and Wei Luo**	The crystallographic structure and the electronic surface states of the ZnO films have a significant impact on biological adsorption. We have investigated the adsorption of 3-aminopropyl triethoxysilane (APTES), which was used as a bridge to protein in the covalent binding of protein, on the surface of ZnO films prepared by RF magnetron sputtering system at different sputtering conditions (eg. different Ar and O2 ratio). The oriented ZnO films with the c-axis (0 0 2) normal to the substrate have good piezoelectric properties for SAW biosensors. The influence of different sputtering conditions on the film structure was studied. Highly oriented films were prapared. Preliminary XPS results indicated that the adsorption increases with the oxygen partial pressure increases.	Engineering Research Center for Functional Ceramics of the Ministry of Education, School of Optical and Electronic Information, Huazhong University of Science & Technology, No. 1037 Luoyu Road, Hongshan District, Wuhan City 430074, PR. China	P.R China
TPS-T2-3	**Synthesis of Gold Nanoplates as Sensing Material for Plasmonic Sensors**	# 2 Technologies for Chemical and Biochemical Sensing	**Muhamad Mat Salleh[1,*], Marlia Morsin[1,2], Akrajas Ali Umar[1]**	The gold (Au) nanoplates were synthesized using seed mediated growth method directly on the substrate surface. The morphology image of Au nanoplates sample by FESEM shows variety of plate shapes such as triangular, hexagonal, truncated hexagonal and flat rod, with edge length ca. 150 nm and the yield can be estimated up to ca. 65 % over all area of substrate surface. The plasmonic property of the Au nanoplates samples was studied from the optical absorption spectra in three different media; air, deionized water and formic acid. The localized surface plasmon resonance (LSPR) peaks position of Au nanoplates samples and their intensities were changed with the change of surrounding medium. Consequently, using an optical sensor system, variation concentration of formic acid solutions can be detected where the difference between peak position and intensity of the (LSPR) spectra of gold nanoplates sample in and water is used as the sensing parameters.	1 Institute of Microengineering and Nanoelectronics (IMEN), Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia. 2.Faculty of Electrical and Electronic Engineering, Universiti Tun Hussien Onn Malaysia, 86400, Parit Raja, Batu Pahat, Johor, Malaysia.	Malaysia
TPS-T2-4	**Highly sensitive gas and UV detector based on ZnO nanorods grown by an ultra fast hydrothermal process.**	# 2 Technologies for Chemical and Biochemical Sensing	**B. S. Witkowski[1], L. Wachnicki[1], S. Gieraltowska[1], P. Sybilski[1], W. Wlodarski[2], M. Godlewski[1,3]**	We have developed a new, fast, safe and inexpensive method for preparation of ZnO nanostructures (nanorods) for sensor applications. We use hydrothermal method and fairly low growth temperature of 50°C. As a substrate can be used almost every commercial substrate with gold or silver nanoparticles prepared on the surface, which nucleate the growth. We used deionized water and zinc acetate as an oxygen and zinc precursors, respectively. The so-obtained gas and UV detector is based on the nanorods obtained on quartz substrate. UV light (below 400 nm of wavelength) generates electron-hole pairs, which results in a removal from the surfaces of the water vapor and hydroxyl groups. This reduces the depletion, and thus lowers the resistance of the structure. The so-obtained sensor works at room temperature	1. Polish Academy of Sciences, Institute of Physics, al. Lotników 32/46, Warsaw 02-668, Poland 2. RMIT University, School of Electrical and Computer, City Campus GPO Box, 2476V, Melbourne 3001, Victoria, Australia 3. Cardinal Stefan Wyszynski University, College of Science, Department of Mathematics and Natural Sciences, ul. Dewajtis 5, 01-815 Warsaw, Poland	Poland, Australia
TPS-T2-9	**Diamond-Based Thin Film Bulk Acoustic Wave Resonator for Biomedical Applications**	# 2 Technologies for Chemical and Biochemical Sensing	**M Zalazar[1] and F Guarnieri[1,2]**	Nowadays it is in constant growing the development of thin film bulk acoustic wave resonators (FBAR) as biosensors. If the piezoelectric material is going to be implanted in the human body, an important requirement is the biocompatibility of the implant. In this regard, Aluminum Nitride (AlN) has emerged as an attractive alternative for use in biomedical MicroElectroMechanical Systems. Ultrananocrystalline Diamond (UNCD) is a promising material to be used in biomedical applications, due to its extraordinary multifunctionality; it is exceptional for implantable medical devices requiring stringent biological performance. Since both UNCD and AlN films can be processed via photolithography processes used in microfabrication, the integration of UNCD and AlN films provides the bases for developing a new generation of biocompatible Bio-MEMS/NEMS. Research and development was conducted to produce implantable MEMS devices: Pt/piezoelectric AlN/Pt layer heterostructure was grown and patterned on the UNCD membrane with a Ti adhesion layer. By applying voltages between the top and bottom Pt electrodes layers the piezoelectric AlN layer is energized. The feasibility of the fabrication of biocompatible AlN/diamond-based FBAR structure as a biosensor has been demonstrated	1. Facultad de Ingeniería, Bioingeniera, UNER, Ruta 11 km 10, Oro Verde (3100), Argentina. 2.CIMEC, INTEC (UNL-CONICET), PTLC, El pozo, Santa Fe (3000), Argentina.	Argentina

TPS-T2-5	**REMOTE DETECTION OF CHEMICAL COMPOUNDS CONTAINING ALPHA-RADIOACTIVE ISOTOPES**	# 2 **Technologies for Chemical and Biochemical Sensing**	**A.B. Simakov, E.M. Onischenko, V.P. Miroshnichenko and N.N. Samotaev**	The results developing of the device for remote detection of chemical compounds containing alpha-radioactive isotopes are given. Negative ions from the alpha particle tracks are detected by discharge wire counter opened to air. Ion clusters being transferred from particle tracks to operated volume by air flux. The mode of separate detection of ions from alpha ionization tracks at presence of accompanying beta- and gamma-radiation can be done. Keywords: alpha-active isotopes, remote detection.	National Research Nuclear University MEPHI, 115409, Kasirskoe highway 31, Moscow, Russian Federation	Russian Federation
TPS-T2-6	**Systematic Approach in Mg^{2+} Ions Analysis: Combination of Tailored Chromophore Design and Optical Detection with Familiar Devices**	# 2 **Technologies for Chemical and Biochemical Sensing**	**C. Guanais Branchini[1], L. Lvova[1], L. Prodi[2], M. Sgarzi[2], N. Zaccheroni[2], C. Di Natale[3], I. Lundström[4], R. Paolesse[1]**	A systematic study of diaza-18-crown-6 hydroxyquinoline (DCHQ) chromophores, devoted to Mg(II) detection, was performed. Functionalization of DCHQ by peripheral substituents influenced differently the chromophore optical properties, so allowing the development of novel all-solid-state optodes, by inclusion inside PVC-based polymeric films. The influence of lipophilic sites incorporation and plasticizer nature on DCHQ-based optodes response was investigated. Fluorimetric and Computer Screen Photoassisted Technique (CSPT) studies on optodes sensitivity towards a number of different metal cations were carried out. The results obtained demonstrated the suitability of the developed DCHQ optodes to perform fast and low cost monitoring of magnesium (II) ions by means of familiar devices.	1 Department of Chemical Science and Technologies, University "Tor Vergata", Rome, Italy 2 Dipartimento di Chimica "G. Ciamician" Università degli Studi di Bologna, Bologna, Italy 3 Department of Electronic Engineering, University "Tor Vergata", Rome, Italy 4 IFM, Linköping University, Sweden	Italy, Sweden
TPS-T2-7	**Qualification of uncoated steel vibrating wire-based sensor in hydrogen detection**	# 2 **Technologies for Chemical and Biochemical Sensing**	**Zouhair Brouzi[1], Mohand-Tayeb Boudjiet[1], Jean-philippe Dubois[2], Isabelle Dufour [1], Johan Bertrand[2]**	In a hazardous environment such as nuclear power plant or radioactive disposal facility such as the envisioned French geological repository for nuclear wastes, atmosphere monitoring in the waste cells are crucial for safety reasons. Vibrating wire sensors are commonly used for strain measurment. Sensing is based in frequency change when stress of wire changes. In this paper, a steel vibrating wire-based sensor was adapted for hydrogen detection without any sensitive coating. The main advantage of this new sensor principle is its simplicity and the reliability. Preliminary measurements have been performed. For the tested device, the limit of detection is less than 0.2% of hydrogen in nitrogen at room temperature as well as high temperature (60°C), knowing that the flammability limit in the air is 4.1%.	1. Univ. Bordeaux – IMS Laboratory – 33 400 Talence – France 2. Andra – 92 298 Châtenay-Malabry – France	France
TPS-T2-8	**An Electrochemical Platform for the Point-Of-Care Diagnosis of Infectious Diseases**	# 2 **Technologies for Chemical and Biochemical Sensing**	**Gloria Longinotti, Gabriel Ybarra, Paulina Lloret, Carlos Moina**	In this work, we present a point-of-care platform for the serologic diagnosis of infectious diseases. The principle of diagnosis can be regarded as an electrochemical enzyme-linked immunoassay. Different recombinant antigens were immobilized onto magnetic microparticles. After incubation with sera and horseradish peroxidase labeled conjugated antibodies, the magnetic particles were collected and placed in electrochemical cells where infected sera were amperometrically detected. All components of the platform were designed and developed during this project, including the electronic instrumentation and novel, disposable electrochemical cells, which allow eight simultaneous measurements. The platform was successfully tested for the diagnosis of foot-and-mouth disease, brucellosis, Chagas disease and infection by STEC O157.	UT Nanomateriales, Centro INTI-Procesos Superficiales, Instituto Nacional de Tecnología Industrial, Argentina	Argentina
TPS-T3-4	**Sensing properties of mixed nanostructured semiconductor films**	# 3 **Mechanisms, Modeling and Simulation**	**J. Trakhtenberg*, G.N. Gerasimov**, V.F. Gromov*, M.A. Kozhushner*, O.J. Ilegbusi****	The sensory response of nanostructured films composed of binary mixtures of indium, tin, zinc and cerium oxides to H2 and CO is experimentally investigated. The dependence of the sensor response on film composition and temperature is determined. The observed maximum sensitivity exceeds the sensitivity of the individual oxides in the nanocomposite systems investigated. The concentration of electrons in the conduction band and the catalytic properties of the sensor material are established to have a decisive influence on the sensitivity. The maximum sensitivity is observed at film compositions corresponding to the occurrence of percolation cluster of electron-rich and catalytically-active nanoparticles. The theory of the sensor response is developed, which adequately describes the experimental data.	* Semenov Institute of Chemical Physics, 119991, Moscow, Kosygin str., 4, Russia **University of Central Florida 4000 Central Florida Blvd., Orlando, FL 32816-2450, USA	Russia, USA
TPS-T3-3	**Modeling hydrogen sensing mechanism of TiO2 based nanosensor**	# 3 **Mechanisms, Modeling and Simulation**	**B. Lyson – Sypien[1], M. Radecka[2], M. Rekas[2], K. Michalow – Mauke[3,4], T. Graule[3], K. Zakrzewska[1]**	The aim of this research is to perform modeling of the interaction between TiO2 based nanosensor and hydrogen taking into account two possible mechanisms of charge transfer: (1) Schottky barriers, (2) conduction channels. Nanopowders of TiO2 and TiO2: Cr are obtained by Flame Spray Synthesis. Morphological properties of the powders are studied using Brunauer–Emmett–Teller adsorption isotherms, X-ray Diffraction, Scanning Electron Microscopy and Transmission Electron Microscopy. Nanosensors are prepared in a form of circular tablets. Hydrogen sensing experiments consist in measuring dynamic changes in the electrical resistance of nanosensors. Modeling procedure proves that the mechanism of the interaction between H2 and nanomaterial can be described on the basis of Schottky barriers formation in the contact region between grains.	1. AGH University of Science and Technology, Faculty of Computer Science, Electronics and Telecommunications, Krakow, Poland 2. AGH University of Science and Technology, Faculty of Materials Science and Ceramics, Krakow, Poland 3. EMPA, Swiss Federal Laboratories for Materials Testing and Research, Laboratory for High Performance Ceramics, Uberlandstrasse 129, 8600 Duebendorf, Switzerland 4. Paul Scherrer Institut, 5232 Villigen – PSI, Switzerland	Poland,Switzerland
TPS-T3-7	**The influence of gate bias on the CO sensing characteristics of SiC based field effect sensors**	# 3 **Mechanisms, Modeling and Simulation**	**Christian Bur[1], M.Andersson[2], A.Schütze[1], A. Lloyd Spetz[2]**	The influence of gate bias on the CO response of Pt gate field effect gas sensors has been investigated and compared to the CO adsorption and oxidation on the Pt surface. The results suggest that the smaller the bias, the higher the CO concentration required in order to induce a transition between a small and a large response towards CO. In terms of the underlying sensing mechanism these trends are hypothesized to reflect the change in relative adsorption kinetics between CO and oxygen at different biases and the reaction of oxygen chemisorbed to the Pt surface with CO to form CO2.	1.Lab For Measurement Technology, Saarland University, D-66123 Saarbrücken, Germany 2.Department of Physics, Chemistry, and Biology (IFM), Linköping University, SE-581 83 Linköping, Sweden	Germany, Sweden
TPS-T3-2	**Theoretical Analysis of Cell Responses to External Stimulation Detected by Surface Plasmon Resonance**	# 3 **Mechanisms, Modeling and Simulation**	**Deng Shijie, Guo Yizang, Dou Fuyin, Wang Peng, Yu Xinglong**	Surface plasmon resonance has the potential of monitoring cell responding to external stimulations and appropriate theoretical model is the basis for its implementation. Here we analyzed quantitatively the simulation-mediated cell responses including the intracellular protein concentration change, the cellular morphology change and the cell/substrate interaction. The mathematical model for interpretation of SPR signals from simulation-mediated cell responses was established. Computer simulations using the FDTD software were performed and results fit well with predicted values of this mathematical model.	Dept. of Precision Instruments, Tsinghua University, Beijing 100084, P. R. China	P.R China
TPS-T3-6	**Toluene/organic-inorganic thin films partition coefficients analyzed with Langmuir adsorption theory and finite elements simulation**	# 3 **Mechanisms, Modeling and Simulation**	**El Sabahy Julien, Berthier Jean, Ricoul Florence, Matheron Muriel, Bordy Thomas, and Jousseaume Vincent**	Volatile organic compounds (VOCs) such as benzene or toluene are increasingly present in our environment and represent a significant risk for human healthcare. In order to detect such gases, sensors with sensitive layers are being developed to capture and concentrate these compounds selectively and in a reversible manner. To develop such layers, an experimental bench was set up to study the affinity towards toluene of hybrid organic-inorganic layers coated on QCM. These chemically active layers deposited by PECVD show K factors higher than those reported in the literature [1]. A simple model associated with numerical simulations was applied to these layers, providing an interpretation of the high K factor values, its concentration dependency and the relations with layers properties.	CEA-LETI MINATEC 17 rue des Martyrs F 38054 GRENOBLE Cedex 9 France	France
TPS-T3-5	**UV modulation of the sensitivity of ZnO nanorods coated quartz microbalances**	# 3 **Mechanisms, Modeling and Simulation**	**G. Magna[1], Y. Sivalingam[1], E. Martinelli[1], R. Paolesse[1], C. Di Natale[1]**	Metal oxide semiconductors are among the most important gas sensors. They are typically utilized as chemoresistors and operated at high temperature. However, the increase of surface in nanostructured materials could also allow the exploitation of different transduction principles. This may provide the possibility to extend the detection to gas molecules that are simply physisorbed and then do not contribute to change the conductivity. An example is offered by zinc oxide (ZnO) that can be prepared in a large manifold of different nanostructures and among them nanorods are particularly appealing. ZnO nanorods have been used as a sensing layer of quartz microbalances demonstrating the increase of effective surface followed by the increase in sensitivity of the device. In ZnO the exposure to UV light is known to promote the gas sensitivity allowing the detection of gases even at low temperature. In this work we have studied the effect of UV light on the room temperature sensitivity of ZnO nanorods coated quartz microbalances. Results show that the exposure to light may improve the sensor response and that the effect is mediated by the concentration of adsorbed oxygen.	1 Department of Electronic Engineering, University of Rome Tor Vergata, 00133 Roma. 2 Department of Chemical Science and Technology, University of Rome Tor Vergata, 00133 Roma.	Italy
TPS-T3-1	**Modeling Complexes of Fluoroionophore [Thiacalix[4]arene + 2 Dansyl Podands] with anions by Molecular Dynamics and DFT**	# 3 **Mechanisms, Modeling and Simulation**	**Ruth Hojvat[1,2], Dora A. Barbiric[3], Eduardo A. Castro[4]**	The selectivity of a thiacalix[4]arene-based fluorescent sensor bearing two dansylpodands on the lower rim towards F^- was analysed by Born-Oppenheimer molecular dynamics combined with PM3 optimizations, followed finally by a DFT optimization of the most stable structuregenerated during the trajectory. Complexes with anions used by experimentalists to compare the sensing properties of this sensor were modeled as well. Simulations predict the release of HF, in agreement with reports. Either theapparent number of H-bonds or the intensities of interactions allow rationalization of the emission intensity differences indicated in the same reports.	1. Dpto. Cs. Básicas (UNNOBA), R. Sáenz Peña 456, Junín, Bs. As., Argentina. 2. Fac. de Ciencias Exactas y Naturales - Universidad de Belgrano, Zabala 1837 (C1426DQG), Argentina 3. Fac. Ingeniería (UBA), Paseo Colón 850, C1063ACV CABA, Argentina 4. INIFTA,División Química Teórica (UNLP),Suc 4,C.C.16, La Plata B1906ZAA, Argentina.	Argentina
TPS-T4-1	**Improvement in SERS measurements with nanostructured surface design and nanoparticle interaction**	# 4 **Emerging Sensing Materials and Technologies**	**L. A. Guerra[1] M. A. Daza Millone,[2,4] E. Cortés,[2] N. Tognalli,[1] M. E. Vela,[2] R. C. Salvarezza,[2] A. Fainstein[1]**	We explore the increase in SERS signal of a probe molecule (p-mercaptobenzoic acid) in different nanostructured surfaces. The area increase and surface shape effects were studied in a gold wire with progressive roughening treatment. Gold void nanocavity substrates, on the other hand, were modified both with Ag layers, with Ag nanoparticles, and by electrochemical roughening in order to improve the SERS signals due to the improved Ag plasmonic response and cavity-nanoparticle interaction.	1. Centro Atómico Bariloche, Instituto Balseiro, Comisión Nacional de Energía Atómica, (8400) S. C. de Bariloche, Pcia. Río Negro, Argentina. 2. INIFTA (CONICET-UNLP) CC16 Suc4 (1900) La Plata, Pcia. Buenos Aires, Argentina.	Argentina
TPS-T4-10	**Mixed-Potential Gas Sensor with Pt/Au Sensing Electrode: EMF Measurement at Isothermal and Thermo-Cyclic Operation**	# 4 **Emerging Sensing Materials and Technologies**	**X.Zhang[1], H.Kohler[2,*], U.Guth[2]**	A commercial mixed-potential gas sensor comprising of a pair of Pt/Au sensing electrodes and a Pt-reference electrode was characterized at isothermal- and thermo-cyclic-operation under exposure to H2, CO and C3H6 ballanced with synthetic air, separately. The sensor showed logarithmic response behavior to the variation of model gas concentration at isothermal operation and strong dependence on temperature. Temperature-dependent dynamic response behavior of the sensor was studied by cyclic triangular variation of the operating temperature at a period of 300s in a temperature range between 410°C and 670°C. Clearly distinct EMF-temperature profiles were found for different model gases and, are discussed with respect to the isothermal data and reversibility/stability aspects.	1.Inst. for Sensorics and Information Systems, Karlsruhe University of Applied Sciences, Moltkestr. 30, D-76133, Karlsruhe, Germany 2.Kurt-Schwabe-Institute for Measuring and Sensor Technology e.V. Meinsberg, Fabrikstr. 69, D-04720, Ziegra-Knobelsdorf, Germany	Germany
TPS-T4-11	**Photoelectrochemical Detection of Cysteine on Metalloporphyrin Coated ZnO nanorods**	# 4 **Emerging Sensing Materials and Technologies**	**Y. Sivalingam[1], L. Lvova[2], R. Pudi[2], G. Pomarico[2], F. Basoli[2], R. Paolesse[2], C. Di Natale[1]**	Porphyrins and ZnO are promising materials for photo-aided chemical sensors development and in particular for the photoelectrochemical detection of proteins and small biomolecules. In this work we investigate the photoelectrochemical properties of one-pot hydrothermally grown metalloporphyrins [Cu(TPPS & Mn(Cl)(TPPS)] coated ZnO nanostructures, deposited on ITO electrodes for cysteine sensing. In particular, electrochemical DPV technique was applied for cysteine oxidation at +0.2 V, and the significant photocurrents were obtained upon UV light illumination. These results explain the working mechanism of the porphyrin-ZnO photoelectrochemical sensing.	1.Department of Electronics Engineering, University of Rome Tor Vergata, Rome, Italy 2. Department of Chemical Science and Technology, University of Rome Tor Vergata, Rome, Italy	Italy
TPS-T4-12	**Zirconium Phosphate-Based Porous Heterostructures: A New Class of Material for Ammonia Sensing**	# 4 **Emerging Sensing Materials and Technologies**	**Thomas Simons[1],José F. Blanco Villalba[2], José Jiménez-Jiménez[2], Enrique Rodríguez-Castellón[2], Ulrich Simon[1]**	Metal phosphates such as zirconium phosphate are well known proton conductors based on the mobility of protons stemming from Brønsted-acid sites. Here we studied the electrical properties of a new porous zirconium phosphate based material by means of electrical impedance spectroscopy. We show that the proton conductivity is supported by solvate molecules like ammonia, which makes Porous Phosphate Heterostructures (PPH) suited for gas phase ammonia sensing.	1. RWTH Aachen University, 52074 Aachen, Landoltweg 1, Germany 2. University of Málaga, Faculty of Science, 29071 Málaga, Spain	Germany, Spain
TPS-T4-13	**Fully integrated lambda sensor based on micro machined silicon platform for oxygen measurements**	# 4 **Emerging Sensing Materials and Technologies**	**Alex Morata[1], Iñigo Garbayo[1], Dolors Pla[1], Marc Salleras[1], Neus Sabaté[1], Albert Tarancón[2], Joan Ramón Morante[2,3]**	A cross plane fully integrated potentiometric micro sensor based on a thin ion conducting membrane and micromachined silicon hotplate has been developed. A new fabrication route is shown that combines silicon industrial micro fabrication processes with the use of nanometric thin films of Yttria Stabilized Zirconia (YSZ) as solid electrolyte. This cross plane configuration allows a huge reduction of the electrolyte thickness. YSZ membranes of 500 nm are used, leading to a drastic drop of the working temperature and thermal mass of the active area of the device. This new paradigm opens the way for the fabrication of reliable, low cost, low consumption and rapid gas electrochemical gas sensors. Examples of oxygen measurements based on te Nerst law are reported and discussed.	1Institut de Microelectrònica de Barcelona, CSIC, Bellatera 08139 Spain; 2 Institut de Recerca en Energia de Catalunya (IREC), E-08930 Sant Adrià del Besòs, Spain; 3 Departament d'Electrònica, Universitat de Barcelona, Barcelona, Spain.	Spain
TPS-T4-14	**Well-Ordered Nb-Ti Nanoporous Oxides for Chemical Sensors**	# 4 **Emerging Sensing Materials and Technologies**	**V. Galstyan[1], E. Comini[1], C. Baratto[1], A. Ponzoni[1], E. Bontempi[2], M. Brisotto[2], G. Faglia[1], G. Sberveglieri[1]**	We report synthesis and gas sensing properties of Nb-Ti nanoporous oxides. The structures have been obtained through the electrochemical anodization of Nb-Ti metallic thin layers at room temperature. The formation and the growth mechanism of obtained porous and tubular structures have been investigated. The nanostructures' chemical sensing properties have been tested in a wide range of operating temperatures towards different gases.	1.SENSOR Lab, Department of Information Engineering, University of Brescia and CNR IDASC, Via Valotti 9, 25133 Brescia 2.INSTM and Chemistry for Technologies Laboratory, University of Brescia, Via Branze 28, 25133 Brescia, Italy	Italy
TPS-T4-2	**Comparative study of gas sensor response of tin oxide nanobelts in different oxidation states**	# 4 **Emerging Sensing Materials and Technologies**	**P. H. Suman[1], A. A. Felix[1,2], H. L. Tuller[2], J. A. Varela[1], M. O. Orlandi[1]**	In this work, we report a comparative study of gas sensor performance of single crystalline tin oxide nanobelts in different oxidation states (SnO, SnO2 and Sn3O4) synthesized by a carbothermal reduction method. Gas sensor measurements showed that the sensor based on Sn3O4 nanobelts exhibit the highest sensor response to 50 ppm NO2 at 200 °C with an approximately 155-fold increase in electrical resistance. Moreover, it was also found that in this operating temperature, Sn3O4 nanobelts display the largest selectivity to NO2 by quartz crystal measurement (QCM). Due to the SiO bonds that form the film structure, good resistance for pH variations can be observed in electrochemical measurements; however, permeation of organic and ionic compounds is still possible, thus the thin films can be used not only as work electrode by also as passive layer for electrochemical sensors.	1.Department of Physical Chemistry, São Paulo State University, 14800-900, Araraquara, Brazil 2.Department of Materials Science and Engineering, Massachusetts Institute of Technology, 02139, Cambridge, USA	Brazil, USA
TPS-T4-3	**Use of TEOS plasma films on the development of gaseous and liquid sensors**	# 4 **Emerging Sensing Materials and Technologies**	**L. F. Hernandez, F. L. de Almeida, R. R. Lima, S. G. Santos Filho, M. L. P. Silva**	The paper describes the use of plasma polymerized tetraethoxysilane (TEOS) and/or TEOS/HFE (methyl nonafluoroisobutyl ether) composite thin films on the development of gaseous and liquid sensors. Since such films are highly clustered, adsorption of volatile organic compounds (VOCs) is privileged; moreover, due to carbon nodules humidity can be detected in large linearity range, as evaluated by quartz crystal measurement (QCM). Due to the SiO bonds that form the film structure, good resistance for pH variations can be observed in electrochemical measurements; however, permeation of organic and ionic compounds is still possible, thus the thin films can be used not only as work electrode by also as passive layer for electrochemical sensors.	Polytechnic School, University of São Paulo, São Paulo, SP, Brazil	Brazil

TPS-T4-4	Colloidal quantum dot (CQD) solids for hydrogen sulfide detection	# 4 Emerging Sensing Materials and Technologies	Min Li, Dongxiang Zhou, Jun Zhao, Zhiping Zheng, Jungang He, Long Hu, Zhe Xia, Jiang Tang, Huan Liu*	We demonstrated a highly sensitive H2S gas sensor based on PbS CQD solids. Interdigital Ag electrodes were first screen-printed onto alumina substrates, followed by the layer-by-layer spin-coating of PbS CQDs (~2.9 nm) and NaNO2 treatment carried out at room temperature in air ambient. As the operating temperature increased within the range 50-135oC, the sensor response increased and the response/recovery time decreased. Fully recoverable response behavior could be observed above 100oC and the highest response toward 50 ppm of H2S was 2389 at 135oC with the response/recovery time being 54/237 s, respectively. The sensor response increased monotonically within the H2S gas concentration 5-100 ppm. The superb response properties may be attributed to the excellent accessibility by gas molecules to CQD surfaces.	School of Optical and Electronic Information, Huazhong University of Science and Technology, 1037 Luoyu Road, Wuhan, Hubei 430074, China.	China
TPS-T4-5	High Sensitive of Titanium Dioxide Nano Fiber Using Chemical Method for Gas Sensor Application	# 4 Emerging Sensing Materials and Technologies	Marwa Abdul Muhsien Hassan, Ibrahim R. Agool and Haidar Abdul Razaq Abdul Hussian	Titanium dioxide TiO2 were prepared using chemical spray pyrolysis technique on glass substrate at (350 oC) with spray rate 5sec./1min. for thickness (420 nm). The material characterization of the TiO2 nanofiber was performed using X-ray diffraction (XRD), Scanning Electronic Microscopy (SEM), Atomic Force Microscopy (AFM). The optical absorption of the fibers were measured using a UV–VIS spectrophotometer. The X-ray diffraction measurements confirmed that the films grown by this technique have good crystalline tetragonal anatase phase structure and with the preferred orientation along the [101] direction. The surface morphology (SEM) of the TiO2 fibers showed that the micrography that nanofiber are extra-fine. UV-VIS transmittance measurements have shown that TiO2 fibers are highly transparent(~ 90 (%in the visible wavelength region, The optical band gap of TiO2 fiber is 3.32eV. Gas sensing characteristics of TiO2 nanofiber upon interaction with H2 and vapor methanol have been recorded in the self-assembled experimental system. The detection of H2 and vapor methanol was carried out over the concentration 50 ppm and at room temperatures 25 ºC. Gas sensing properties showed that TiO2 nanofiber were sensitive as well as fast in responding to H2 and vapor methanol.	Department of physics, College of Science, Al-Mustansiriyah University, Baghdad, Iraq.	Iraq
TPS-T4-6	Gas sensing properties of p-type $CuBi_2O_4$ thin films	# 4 Emerging Sensing Materials and Technologies	Yun-Hyuk Choi, Dai-Hong Kim, Seong-Hyeon Hong, Kug Sun Hong	The p-type semiconducting CuBi2O4 thin films were deposited with thickness of 230 nm by metal-organic decomposition including thermal annealing. Their morphology, polycrystalline phase and chemical composition were characterized by a field emission scanning electron microscope (FE-SEM), X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS), respectively. The gas-sensing properties of these tetragonal oxide thin films were systematically investigated toward reducing C2H5OH, H2, NH3, CO, H2S and oxidizing NOx gases at the operating temperatures of 200-500 °. As a result, the superior p-type sensing responses were confirmed. The detailed mechanism for the responding behaviors will be dealt with in terms of carrier density and defect structure.	Department of Materials Science and Engineering, Seoul National University, Seoul 151-744, Republic of Korea	Republic of Korea
TPS-T4-7	A comparative study on the performance of TlBr detector crystals grown in different atmosphere	# 4 Emerging Sensing Materials and Technologies	Dongxiang Zhou, Xianwu Chen, Zhiping zheng , Qiuyun Fu, Yunxiang Hu, Shuping Gong	TlBr single crystals were grown by electro dynamic gradient (EDG) method in various ambient atmospheres: vacuum, air and oxygen with different oxygen concentration. In order to evaluate the crystals obtained under each condition, routine measurements including the optical and electrical characteristics and energy response spectrum were carried out. The ambient atmosphere above melt plays crucial role for the characteristics of TlBr crystals growth. Crystal grown in oxygen atmosphere obtained the best performance.Good crystal quality is believed to connect with the considerable oxygen concentration above the melt. An appreciable concentration of oxygen is helpful in decreasing Tl precipitates in TlBr crystals.	School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan, 430074, P.R. China Address: RM 404, 7th West Building, No.1037 Luoyu Road, Hongshan District, Wuhan city, Hubei Province, China. 430074	China
TPS-T4-8	Investigation of pyrolytic graphite layers as an electrode material for voltammetric sensors of explosives	# 4 Emerging Sensing Materials and Technologies	Johanna Riedel[a,b]*, Monika Berthold[b], Ulrich Guth[a]	Pyrolytic graphite is suited as electrode material (PGE) for the electrochemical analysis of dissolved explosives in aqueous solutions. The carbon layers were prepared by pyrolysis of aromatic compounds in argon on alumina substrates. The layers obtained are micro crystalline with a thickness of about 4 µm. By the use of differential pulse voltammetry (DPV) two peaks are clearly separated and assigned to the reduction of nitro groups. 2,4,6-trinitrotoluene (TNT) and 2,4-dinitrotoluene (DNT) can be determined in a concentration range between 2.5 ppb and 1000 ppb ($R2 = 0.998$). Similar results are obtained when nano structured electrodes are used, but the measurements are influenced by dissolved oxygen.	a) Dresden University of Technology, Department of Chemistry and Food Chemistry, Bergstr. 66c, D-01062, Dresden, Germany b) Kurt-Schwabe Research Institute Meinsberg, Kurt-Schwabe-Str. 4, D-04736 Waldheim	Germany
TPS-T4-9	Macroporous In2O3 Sensing Layers by PMMA Microsphere Templating	# 4 Emerging Sensing Materials and Technologies	Alexander Weiß[1], Dominik Klaus[1], Sabrina Amrehn[1], Danielle Klawinski[2], Michael Tiemann[1], Thorsten Wagner[1]	We present a method of synthesizing macroporous indium oxide (In2O3) (inverse opal) sensing layers for resistive gas sensing directly on sensor substrates by microsphere templating using PMMA (polymethylmethacrylate) beads. Since there is no additional layer deposition process necessary there is no (negative) influence on the morphological features of the nanomaterial. The macroporosity ensures high gas accessibility and thereby allows fast gas response and regeneration. By illuminating the sensing layer with blue light reaction and regeneration are further enhanced, facilitating even room-temperature measurements. First results on light-assisted ozone sensing are presented.	1.Institute of Applied Physics, Justus Liebig University Giessen, D-35392 Giessen, Germany 2.Faculty of Science, Department of Chemistry, University of Paderborn, D-33098 Paderborn Germany	Germany
TPS-T4-15	Micro-Stamped Self-Standing Humidity and Temperature Sensors	# 4 Emerging Sensing Materials and Technologies	A. Vasquez Quintero, F. Molina-Lopez, D. Briand, G. Mattana, N.F. de Rooij	In this work we report on a printed self-standing parallel-plate capacitive humidity sensor on a thin dry film photoresist with integrated resistive temperature sensor and heater. The simple concept proposes dry photoresist film as substrate but also as dielectric humidity sensing layer. The film is placed in-between the two capacitor electrodes used as well as temperature sensor and heater, respectively. The humidity sensor detects moisture-induced changes in the dielectric constant of the dry film with integrated temperature calibration. Moreover, sensing performances can be improved by locally heating the sensing layer. The presented sensor design enables a low-complexity fabrication of relatively fast printed and polymeric humidity sensors with integrated thermal functionalities in a single structure. Inkjet printing and micro-stamping techniques used for its realization will be compared in terms of linewidth resolution and sensors performances.	Ecole Polytechnique Fédérale de Lausanne (EPFL), Institute of Microengineering (IMT), Sensors, Actuators and Microsystems Laboratory (SAMLAB), Neuchâtel, Switzerland	Switzerland
TPS-T5-1	Analysis and implementation of robust algorithms for classification of samples in electronic noses	# 5 Sensor Arrays and Data Analysis	Vorobioff J.[1], Rinaldi C.A.[1,2] Boggio N.G.[1,2]	There are many pattern recognition algorithms for classify different samples [1-4]. These algorithms can be combined for data analysis of sensor array. In turn, they can be implemented in different ways and with different parameters. In this work different methods for signal processing for electronic nose are implemented, each of which consist of several algorithms. This methods are analyzed, using our own software in an automated manner, signals of measurements of fish are processed and their results are analyzed for each method. Using cross validation, for each method correct recognition index (IR) was calculated. After compare IR and extensive testing and analysis of different methods, very robust algorithms were implemented and excellent results were obtained.	1.Comisión Nacional de Energía Atómica. Av. Gral Paz 1499 - San Martín (1650), Buenos Aires, Argentina 2.Consejo Nacional de Investigaciones Científicas y Técnicas , Av.Rivadavia 1917(1033),CABA, Argentina	Argentina
TPS-T5-2	The recognition of perfume using electronic nose based on SVM	# 5 Sensor Arrays and Data Analysis	Xiaodong Mei[1], Biao Wang[2], Zhe Zhu[1], Peilu Zhao[1], Xiaolong Hu[1], Peng Sun[1], Geyu Lu[1]*	A portable electronic nose (e-nose) system has been designed for perfume recognition. The system is composed of metal oxide semiconductor sensor arrays, sensor signal conditioning circuit, microcontroller and pattern recognition. This paper reports the structure of as-designed e-nose system and pattern recognition based on support vector machine (SVM), which can improve the generalization performance of small sample. Moreover, the e-nose software package has been developed and made as an executable file. Through the recognition of various kinds of perfume, the feasibility of this system was confirmed.	1. State Key Laboratory on Integrated Optoelectronics, College of Electronic Science and Engineering, Jilin University, Changchun, 130012, People's Republic of China; 2. Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun 130033, People's Republic of China.	People's Republic of China
TPS-T5-3	A Novel Instrument to Predict the Aroma of Basmati and Other Aromatic Rice Varieties Using Pure quadratic Response Surface Model	# 5 Sensor Arrays and Data Analysis	Arun Jana[a*], Nabarun Bhattacharyya[a], Rajib Bandyopadhyay[b], Bipan Tudu[b], Subhankar Mukherjee[a], Devdulal Ghosh[a], Jayanta Kumar Roy[a], Bijan Adhikary[c], Chinmoy Kundu[c]	This article describes about an instrument and method for aroma based quality detection of Basmati and other aromatic rice varieties. It comprises few modules such as odour delivery module, sniffing module, water bath module and computing module. Odour handling module helps to deliver odour to the sensor array; a sniffing unit comprising a sensor array module that includes a eight number of semiconductor sensors assembled on a printed circuit board, said printed circuit board fitted into a sensor chamber; a water bath module for preparing rice sample, said water bath module including a heater attachment to facilitate cooking; a computing module to quantify the aroma data acquired by said sensor; a data acquisition module etc. For aroma quantifying, purequadratic response surface methodology has been used with mean square error 0.0028.	a.Centre for Development of Advanced Computing, Kolkata – 700091, India b.Jadavpur University, Kolkata – 700098, India c.Rice Research Station, West Bengal, India	India
TPS-T5-4	A novel cell-based biosensor for bitter taste detection	# 5 Sensor Arrays and Data Analysis	Liang Hu[2], Liping Du[1], Qi Dong[1], Liujing Zhuang[1], Liquan Huang[2], Ping Wang[1]*	A novel cell-based biosensor which could respond to bitter compounds sensitively and specifically was established. By specifically interacting with bitter compounds, isolated taste receptor cells (TRCs) from taste buds were utilized as sensing elements. 60-channle microelectrode array (MEA) chips were employed to record the extracellular electrophysiological responses of TRCs to different bitter compounds. The results show that different bitter stimuli such as quinine, cycloheximide and denatonium significantly evoked specific responses respectively. It demonstrates that this hybrid biosensor is reliable and effective in detection and discrimination of these bitter compounds.	1.Biosensor National Laboratory, Key Laboratory of Biomedical Engineering of Education Ministry, Department of Biomedical Engineering, Zhejiang University, Hangzhou, China 2.Monell Chemical Senses Center, 3500 Market Street, Philadelphia, PA 19104, USA	China; USA
TPS-T5-5	Electronic nose control of cooked ham storage conditions Light enhanced gas sensors based on porphyrins and ZnO hybrids	# 5 Sensor Arrays and Data Analysis	Rosamaria Capuano[1], Eugenio Martinelli[1], Roberto Paolesse[2], Corrado Di Natale[1], Fatou Toutie Ndoye[2], Sofia Barrios[3], Graciela Alvarez[3]	Quality and shelf life of packaged meat and fish strongly depend on the storage temperature [1, 2]. Since spoilage processes clearly the pattern of the volatile compounds emitted by the product, the investigation of food headspace is a viable method to determine the quality of packaged food. In this paper we investigated, with an electronic nose, the correlation between changes of VOC emission of cooked ham and different storage conditions. Results indicate the relationship between storage temperature and shelf-life and the possibility to retrieve, from the electronic nose signals, the storage conditions (temperature and storage time).	1.Department of Electronic Engineering, University of Rome Tor Vergata 1.Department of Chemical Science and Technology, University of Rome Tor Vergata 2.IRSTEA - Unité de Recherche Génie des Procédés Frigorifiques FRANCE	Italy, France
TPS-T5-6	Progress towards an Automatic T-Cycle Optimization Utilizing an Integrated Gas Sensor Testing and Evaluation Toolbox	# 5 Sensor Arrays and Data Analysis	Thomas Fricke[1], Thorsten Conrad[2], Tilman Sauerwald[1], and Andreas Schütze[1]	We present an integrated gas mixing and measurement system specialized in the survey of gas sensors operated with temperature cycled operation (TCO). The design of the system enables a closed loop optimization of the TCO, based on various objectives, e.g. sensitivity and selectivity. We employ a procedure for the sensitivity optimization based on a simple sensor model. The procedure is tested with ethanol (0.5 ppm) and benzene (25 ppb) as a first step towards more complex atmospheres. Furthermore we outline how this procedure can be used to define a TCO with high sensitivity and selectivity.	1. Lab for Measurement Technology, Dept. of Mechatronics, Saarland University, 66123 Saarbrücken, Germany 2. 3S – Sensors, Signal processing, Systems GmbH, 66121 Saarbrücken, Germany	Germany
TPS-T5-7	Identification of formaldehyde under different interfering gases conditions	# 5 Sensor Arrays and Data Analysis	Lin Zhao[a, b], Jing Wang[a,c], Peng-Jun Yao[a], Yong-Ping Xie[a], Wei Wu[a]	A sensor array with pattern recognition methods was used to identify formaldehyde in complex interfering gases. The interfering gases were single component gas or three component mixtures gas. The sensor array consisted of four semiconductor gas sensors, of which two nanofiber sensors are made in our library. Extreme learning machine (ELM) with principal component analysis (PCA) and support vector machines (SVM) was introduced and compared. ELM method is used to decrease the training time, and PCA method is used to improve the accuracy by preprocessing the sensors data. ELM networks achieve dozens times faster training speed than SVM, and ELM networks with PCA achieve good classification accuracy. But the accuracy of SVM method was a little better than that of ELM networks.	a. School of Electronic Science and Technology, Dalian University of Technology, Dalian 116023, PR China b. School of Computer Science and Technology, Dalian Neusoft University of Information, Dalian 116023, PR China c. School of Mathematical Sciences, Dalian University of Technology, Dalian 116023, PR China	PR China
TPS-T6-2	Miniplatform for cell culture growing and monitoring	# 6 Auxiliary Components, Manufacturing and Packaging	Ion Stan, Carmen Moldovan, Bogdan Firtat*, Clara Moldovan	The paper will present the design and implementation of a microfluidic platform able to deliver the needed nutrients for the cell culture nutrition and growth or insertion of different analytes (toxicants or others) together with a microsensor chip able to monitor the temperature, the pH and the impedance of the cell culture. The design of the microfluidic platform is taking into consideration the possibility to deliver to the cell culture six different liquides. The liquides placed in six reservoirs are delivered using six micropumps working independently. The liquides can be pumped one by one or mixed together according to the biological application protocol. The liquids are mixed together into a preparation vessel and after that sent to the miniincubator hosting the cell culture. The miniplatform allows the cell culture growing and 24/7 monitoring using data aquisition Labview based.ss	ELECTECH RESEARCH & CONSULTING SRL, Ion Mihalache, 166, sector 1, Bucharest, Romania; *MEMSOP Consulting SRL, Vidra, Jud Neamt, Romania	Romania
TPS-T6-1	HIGH RESOLUTION LASER ENGRAVING OF MICROHOTPLATES: A WAY FOR EASY PROTATYPIZATION OF GAS SENSORS	# 6 Auxiliary Components, Manufacturing and Packaging	N.N. Samotaev, A.A. Vasiliev, S.A. Soloviev, A.V. Kushneruk, K.Y. Oblov, Y.A. Voronov and D.V. Sushko	A novel cost-effective simple technology for the production of thin boron-silicate glass MEMS applied as microhotplate platform for metal oxide gas sensors is described. The basis of the technology is a combination of magnetron sputtering of metallization layer with high resolution laser engraving used for heater and substrate patterning. As a result of the application of this technology, was manufactured 3D micrometers thick glass cantilever microhotplate equipped platinum microheater with area 500 on 500 micrometers. The cantilever type MEMS microhotplate demonstrates very high stability at working temperatures up to 600 degrees Celsius, which gives possibility to use it for the protatypization and pilot production of metal oxide gas sensors.	National Research Nuclear University MEPHI, 115409, Kasirskoe highway 31, Moscow, Russian Federation	Russian Federation
TPS-T7-1	$SrTiO_3$ thin films doped with Fe and La applied as ozone gas sensor	# 7 Sensing for Health, Safety and Security	C. A. Escanhoela Jr[1], A. C. Catto[1], L. F. da Silva[2], K. Aguir[3], S.C. Zilio[1], V. R. Mastelaro[1].	Gas sensors are currently needed for monitoring the concentrations of different gases in the industrial process and environmental control. Consequently, the research on the development of gas sensors targeting this application. Recently in the literature, the strontium titanate doped with iron was suggested as a good candidate for application as ozone gas sensors. The aim of this study was the synthesis and characterization of SrTi0.85Fe0.15O3 (STF) and Lai0.025r0.98Ti0.85Fe0.15O3 (SLTF) thin films by electron bean deposition technique in order to verify their ozone sensing properties.	1 Instituto de Física de São Carlos, Universidade de São Paulo, 13566-590, São Carlos, SP, Brazil 2 Instituto de Química, Universidade Estadual Paulista, 148000-900, Araraquara, SP, Brazil 3 CNRS, IM2NP (UMR 7334), Aix-Marseille Université, 13397, Marseille, France	Brazil, France
TPS-T7-10	Daphnia Magna toxicity bioassay simulation with potentiometric electronic tongue.	# 7 Sensing for Health, Safety and Security	D. Kirsanov[1,2], E. Legin[1], A. Zagrebin[4], N. Ignatieva[4], V. Rybakin[4], A. Legin[1,2]	This report describes an original application of potentiometric electronic tongue (ET), in which the set of electrochemical sensors was calibrated against Daphnia magna death rate in toxicity assessment of pond waters in city and suburbs of St. Petersburg. PRM (partial robust M) and PLS (projections on latent structures) regression models based the data from this multisensory system allowed for prediction of toxicity in unknown samples without immediate involvement of living creatures. Typical relative errors were below 20% which can be considered as a very nice result taking into account the complexity of the task.	1 Laboratory of Chemical Sensors, St. Petersburg State University, St. Petersburg, Russia 2 Laboratory of Artificial Sensor Systems, St.Petersburg National Research University of Information Technologies, Mechanics and Optics, St. Petersburg, Russia 3 Sensor Systems LLC, St. Petersburg, Russia 4 Institute Of Limnology, Russian Academy Of Science, St. Petersburg, Russia	Russia

TPS-T7-7	**Optical NO2 Sensing Based on Mesoporous Sol–gel Impregnated with Lutetium Bisphthalocyanine**	**# 7 Sensing for Health, Safety and Security**	**Driss LAHEM[a,*], Marc DEBLIQUY[b], Alexandre VAN BAEKEL[b], Marcel BOUVET[c], and Marie-Georges OLIVIER[a,b]**	In this work we present the results of a sensor using a coating consisting of lutetium bisphthalocyanine (LuPc2) dispersed in a porous silica matrix. LuPc2 shows a strong and reversible gasochromic effect with NO2 in the ppm range. Its absorption spectrum strongly changes in contact with NO2 for visible and near-infrared regions. In comparison with LuPc2 layer deposited by sublimation, we showed that the response time is drastically shortened when LuPc2 is grown in a mesoporous matrix. It drops from hours to a few minutes. Although the recovery is very slow at room temperature, we found that a short exposure to UV-light of the film leads to a drastic reduction of this recovery time from hours to a few minutes.	a.MateriaNova, Parc Initialis, 1, Avenue Nicolas Copernic, 7000 Mons, Belgique. b.Service de Sciences des Materiaux, Faculté Polytechnique de Mons, Université de Mons, 56 Rue de l'Epargne, 7000 Mons, Belgique. c.Service d'Electrochimie, Materiaux Moléculaires et Dispositifs (EMMD), Institut de Chimie Moléculaire de l'Université de Bourgogne (ICMUB), 9 Avenue Alain Savary, 21078 Dijon, France.	Belgium ; France
TPS-T7-9	**Screen-Printed PZT Cantilevers with de-aluminated type Y zeolites for BTX Detection**	**# 7 Sensing for Health, Safety and Security**	**F. Almazán[1], M. Urbiztondo[1], M.P. Pina[1], E. Llobet[2], H. Debéda[2]**	Environmental BTX monitoring is becoming of major importance due to their significant adverse effects on human health. In this work, low-cost screen-printed piezoelectric PZT cantilevers coated with de-aluminated large pore zeolites have been fabricated and deployed as chemical sensors for BTX detection. In particular, the influence of nature (i.e. FAU type zeolite with different Si/Al ratio and extra-framework cation) and amount (7% to 25% wt. referred to the PZT beam) of the sensing layers on the sensor performance for benzene detection at ppm level have been discussed. Similar experiments have been also carried out on Si microcantilevers for comparison purposes.	1.Nanoscience Institute of Aragon, University of Zaragoza, 50018 Zaragoza. Spain 2. Minos-EMas, Rovira I Virgili University, 43007 Tarragona, Spain 3.University of Bordeaux, IMS Laboratory, 33405 Talence Cedex, France	Spain, France
TPS-T7-5	**Gas Sensing Properties of Spray Pyrolysis Deposited ZnO Thin Films - Influence of Zinc Precursors**	**# 7 Sensing for Health, Safety and Security**	**Ganesh Kumar Mani, Prabakaran Shankar and John Bosco Balaguru Rayappan***	The effect of different precursor salts on the structural, morphological,optical and gas sensing characteristics of ZnO thin films was investigated. Towards this objective, zinc acetate, zinc nitrate and zinc chloride precursors were used to spray deposit the nanostructured ZnO thin films. X-ray diffraction patterns confirmed the polycrystalline nature with hexagonal wurtzite structure of the films. Scanning electron micrographs revealed the tiny, large spherical nanograins and nanoplateletsmorphologies of the films. Optical band gap was found to be 3.17, 3.10 and 3.20 eV for films prepared using acetate, nitrate and chloride precursors respectively. The room temperature sensing response of the films was tested towards ammonia, ethanol, formaldehyde and acetaldehydevapours. The response and selectivity of these films could be the cost effective solutions of the challenges in fabricating low power gas sensors.	Centre for Nanotechnology & Advanced Biomaterials (CeNTAB) & School of Electrical & Electronics Engineering (SEEE) SASTRA University, Thanjavur - 613 401, Tamil Nadu, India.	India
TPS-T7-6	**Opportunistic Smartphone Sensing for Safety**	**# 7 Sensing for Health, Safety and Security**	**Hans Scholten, Okan Turkes, Le Viet Duc**	Emergencies happen unexpectedly. But, however unlikely the place or time, it is highly probable people are in the neighborhood equipped with smartphones which can be used as sensors to evaluate the situation. Modern smartphones have a multitude of onboard-sensors. And if the required sensor is not available, attaching a small sensor board via Bluetooth is simple and easy. Readings from one sensor may be unreliable, but when tens or even thousands of sensors locally combine their readings, the collected data becomes reliable and trustworthy, because the information cannot be manipulated. Traditional opportunistic sensor schemes rely on a GPRS or UMTS Internet connection to spread the data. However, experience learns that in emergencies the GSM network may be overloaded, down or switched off by authorities. We show the usefulness of smartphones as sensor and how local communication, such as WiFi or Bluetooth, is used for dissemination of sensor data, so it can be processed locally in clusters of smartphones (flocks) in absence of GSM and a central server.	Pervasive Systems, University of Twente, POB 217, 7500AE Enschede, the Netherlands	Netherlands
TPS-T7-2	**The effect of morphologies in the ozone gas sensing performance of ZnO samples**	**# 7 Sensing for Health, Safety and Security**	**Luis F. da Silva, [1,2] Ariadne C. Catto,[2] Valmor. R. Mastelaro,[3] Khalifa Aguir,[4] Elson Longo[1] and Caue Ribeiro[4]**	Zinc oxide is an n-type semiconductor exhibiting potential applications in solar cells, catalyses and recently in ozone gas sensor. Herein, we prepared zinc oxide powders with different morphologies (urchin and rods-like) via co-precipitation and hydrothermal method. The influence of morphology on the structural properties, surface area and porosity was investigated by x-ray diffraction, nitrogen adsorption isotherms and scanning electron microscopy. Electrical resistance measurements were performed to study the importance of morphology features on ozone gas sensing performance. The results showed a good sensitivity with maximum at 300oC for both morphologies. We also verified a highest sensitivity for urchin-like compared with the rods-like structures, evidencing that the morphology and grain size control is a key parameter to enhance the gas sensor performance.	1 – Instituto de Química, UNESP, Rua Prof. Francisco Degni 55, 14800-900, Araraquara, SP, Brazil 2 – Instituto de Física de São Carlos, USP, Av. Trabalhador São-carlense 400, 13566-590, São Carlos, SP, Brazil 3 – IM2NP (UMR CNRS 7334), Aix-Marseille University, 13397, Marseille, France 4 – EMBRAPA Instrumentação, Rua XV de novembro 1452, 13560-970, São Carlos, SP, Brazil	Brazil, France
TPS-T7-8	**Real time detection of nucleosides analogs in liquid medium with molecularly imprinted polymer coated Love wave sensor**	**# 7 Sensing for Health, Safety and Security**	**N. Lebaz[1], H. Hallil[1], JL. Lachaud[1], V. Raimbault[1], C. Dejous[1], R. Delepee[2], L. Agrofoglio[2], D. Rebiere[1].**	The present work deals with the development of a Love-wave biosensor platform coated with thin film Molecularly Imprinted Polymers (MIPs) for the detection of Adenosine Mono Phosphate (AMP) in liquid medium. The acoustic delay-line is associated to a microfluidic chip and inserted in an oscillation loop in order to record the resonance frequency. Real-time response of the MIP layer to various concentrations of AMP has been investigated. Detection limit as low as 5ppm has been achieved with this configuration.	1.Univ. Bordeaux, IMS laboratory, CNRS UMR 5318, Univ. Bordeaux1 IPB, Talence, France 2.Univ. Orleans, ICOA, CNRS UMR 7311, Orleans, France	France
TPS-T7-4	**An interesting porous hexagonal ZnO nanodisk based multiple - layered structure and its enhanced ethanol sensing properties**	**# 7 Sensing for Health, Safety and Security**	**Nan Qin [a], Qun Xiang [b], Jiaqiang Xu [b,*]**	The interesting porous hexagonal ZnO nanodisk multiple-layered structure was synthesized by a simple two steps liquid phase method. The BET specific surface area of the material reached 38.17 m2/g. As shown in Fig. 1(a) and 1(b), after the heat treatment, the unique structure of the product, inherited from the precursor could be still maintained. The multiple-layered structure was composed of some hexagonal ZnO nanodisks by orderly stacked together. The size of single porous hexagonal ZnO nanodisk was ranged from 1 μm to 10 μm. In Fig. 1(c) and 1(d), the thickness of an individual nanodisk was about 100 nm, and the diameter of the pores formed on the nanodisk was about tens of nanometers. Gas sensing test indicated that the sensor based on the porous hexagonal ZnO nanodisk multiple-layered structure had an excellent gas sensing behavior toward ethanol. In Fig. 2, at the working temperature 330 °, the response of the sensor to 50 ppm ethanol was up to 87.3, which was at least two times higher than other testing gases. Moreover, even down to 1 ppm ethanol, the response still could reach 3.2. The response time and recovery time of the sensor to 50 ppm ethanol were 26 s and 16 s, respectively. All of these proved that the hexagonal ZnO nanodisk based multiple-layered structure material used for ethanol detecting was very hopeful.	a. Department of Physics, College of Science, Shanghai University, Shanghai, 200444, China b. NEST Lab, Department of Chemistry, College of Science, Shanghai University, Shanghai, 200444, China	China
TPS-T7-3	**A novel Copper(II) Extended Linear Chain Material based on QCM sensor that mass-sensitively to formaldehyde vapor**	**# 7 Sensing for Health, Safety and Security**	**Nana Qian Zhiming Duan* Yuan Zhang Jiaqiang Xu***	A layer of copper(10 mm - 0.1 mm) was plated on the silver electrode of quartz crystal micro balances, then, a material, Cu2+ (DDS)2 Cl-1 (MeO) -1 (Bis(4-aminophenyl) sulphone, DDS) has been synthesized via in-situ growth on the chip. The X-ray crystallographic data shows that the Cu2+ (DDS)2 Cl-1 (MeO) -1 reveals a novel linear chain. The as-synthesized linear material displays highly selectivity behaviors toward formaldehyde vapor when measured using a quartz crystal microbalance (QCM) attributing to a special chemoactivity between amino group and methanal vapor1,2. The QCM sensors exhibit excellent sensitivity toward trace formaldehyde vapor down to parts per billion level, which shows great potential in volatile organic chemicals (VOCs) detection of the indoor air.	Department of Chemistry, College of Science, Shanghai University, Shanghai, 200444,PR China	P R China
TPS-T8-1	**Manganite Based Devices for Resistive Memory Applications**	**# 8 Sensors for High Temperature Processes and Harsh Environment Applications**	**D. Rubi[1,2,3], F. Tesler[1,2], I. Alposta[1], A. Kalstein[1,2], N. Ghenzi[1,4], S. Bengio[1,4], G. Zampieri[1,4], S. Suarez[1,4] G. Bernard[1,2], M. Rozenberg[1,4], and P. Levy[1,2]**	A Particulate matter (PM) sensor based on resistive technology was developed. Sensing element consisting in inter-digital platinum electrodes and platinum heater was developed by screen-printing technology. All sensors parts, like nozzle and heater were modeled in order to ensure adequate soot collection and regeneration. Polarization applied between collecting electrodes allowed to improve sensor sensitivity. PM sensor response was characterized using various equipment's (engine test rigs, chassis dynamometer, particulate test rig), to understand and model influence of key parameters on sensors response (gas flow, temperature, soot concentration). Evaluations	1. Departamento de Física de Materiales Comisión Nacional de Energía Atómica, Av. Gral Paz 1499, San Martín, Buenos Aires, Argentina 2. Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina. 3. Escuela de Ciencia y Tecnología, UNSAM, Campus Miguelete, (1650), San Martín, Buenos Aires, Argentina 4. Centro Atómico Bariloche (CNEA), Av. E.Bustillo km 9500 (8400), S. C. de Bariloche, Río Negro. Argentina 5. Universidad de Buenos Aires, Ciudad Universitaria, Pabellón I (1428), Ciudad Autónoma de Buenos Aires, Argentina. 6. Laboratoire de Physique des Solides, Université Paris-Sud, Orsay 91405, France.	Argentina; France
TPS-T8-5	**PM sensor development and simulation for Diesel Particulate Filter On Board Diagnostic**	**# 8 Sensors for High Temperature Processes and Harsh Environment Applications**	**J. Lavy*, C.N. Millet[a], Y. Creff*, B. Youssef*, F. Duault[b], S. Raquin[b], Jean-Paul Viricelle[c], Philippe Breuil[c], C. Pijolat[c],**	A Particulate matter (PM) sensor based on resistive technology was developed. Sensing element consisting in inter-digital platinum electrodes and platinum heater was developed by screen-printing technology. All sensors parts, like nozzle and heater were modeled in order to ensure adequate soot collection and regeneration. Polarization applied between collecting electrodes allowed to improve sensor sensitivity. PM sensor response was characterized using various equipment's (engine test rigs, chassis dynamometer, particulate test rig), to understand and model influence of key parameters on sensors response (gas flow, temperature, soot concentration). Evaluations	a.IFP Energies nouvelles, Rond-point de l'échangeur de Solaize, BP 3, 69360 Solaize, France b. EFI Automotive, 01700 Beynost, France c. Ecole Nationale Supérieure des Mines, SPIN-EMSE, CNRS:UMR5307, LGF, F- 42023 Saint-Etienne, France;	France
TPS-T8-2	**Fabry Perot interferometric sensor for gas detection**	**# 8 Sensors for High Temperature Processes and Harsh Environment Applications**	**S. Ortiz, C. Rinaldi, K. Pierpauli, C. Toro Salazar, M. Bellino, C. Ferrari, J. Bonaparte, A. Lamagna**	In this work, we present an optical sensor based on Fabry Perot (FP) interferometry, for characterization of gas samples contained in, or flowing through, millimeter-sized cells. Sensors were made by coating a thin nanostructured layer of metal dioxides (e.g., SiO2, TiO2) on silicon wafers. Interference results from multiple reflections originated at air-layer and the layer-silicon interfaces, leading to circular fringes that are captured by a CMOS sensor near the focal distance of a convergent lens. The presence and amount of analyte in the cells produce measurable shifts in the interferometric fringes. These shifts are related to variations in the refraction index and depth of the thin layers, which can be estimated by a simple geometric model. Here, we show our first experimental results, relate them to theoretical models for chemical adsorption on thin layers, and discuss future lines of	Comisión Nacional de Energía Atómica, Av. Gral Paz 1499, Buenos Aires, Argentina	Argentina
TPS-T8-3	**Remote Water Quality Monitoring in Wide Area**	**# 8 Sensors for High Temperature Processes and Harsh Environment Applications**	**Wan-Young Chung and Jae-Ho Yoo**	A water quality monitoring technology in a wide area is developed to detect water pollution in streams, rivers and coastal areas. A wireless sensor network (WSN) technology is used to cover wide measuring area without any communication infrastructures. The water quality sensor module is used to measure the water pollution data such as DO, pH, conductivity, turbidity, depth of water, and temperature. Such a water pollution data from a water quality sensor modules are transmitted between the field servers with the sensor modules and finally, to the base station (BS) through a designed self-organizing autonomous wireless sensor network. Here a field server consists of a water quality sensor module to collect the water quality data, an ATmega128 microcontroller for data processing and control, and a wireless sensor node for the transmission of the water quality data.	Pukyong National University, Busan 608-737, Korea	Korea
TPS-T8-4	**Highly Sensitive, Selective Mixed Potential Hydrogen Sensor Using ZnWO4 Sensing Electrode**	**# 8 Sensors for High Temperature Processes and Harsh Environment Applications**	**Zhaoyun Tang, Xiaogan Li*, Jianhang Yang, Jun Yu, Jing Wang, Zhenan Tang.**	Monoclinic ZnWO4 has been investigated for the first time for the sensing electrode of the yttria-stabilized zirconia (YSZ) based mixed-potential hydrogen sensors. The sensor of ZnWO4/YSZ/Pt indicated a good sensitivity to hydrogen with a concentration from 0.5 vol% to 3.0 vol% and excellent selectivity over some possible interefernt such as CO, propane and NO2 at 600 oC in a background of 10 vol% oxygen balanced with nitrogen. The sensor also exhibited excellent signal repeatability. The half-month long term performance has been examined.	1.School of Electronic Science and Technology, Institute for Sensing Technologies, Dalian University of Technology, Dalian, 116024, China.	China
TPS-T10-1	**Microfluidic device for DNA electrophoresis**	**# 10 Hybrid Devices**	**B. Lerner[1,3], M. S. Perez[1,2], P. A. Kler[2], C. Lasorsa[1,2], and C. L. A. Berli[2]**	The development of a novel microfluidic device that includes a circular microchannel and integrated electrodes for DNA electrophoresis is reported. The geometry of the separation channel and the arrangement of the embedded electrodes provide several advantages in relation to conventional linear microchannels. The electrophoretic transport of DNA samples was studied under different voltage configurations. The experiments reported show the functionality of the device.	1 Laboratorio de Procesamiento por Plasma, UTN, Buenos Aires, Argentina 2 INTEC (UNL-CONICET), Santa Fe, Argentina. 3 Grupo de Micro y Nanotecnología, Comisión Nacional de Energía Atómica, Buenos Aires, Argentina.	Argentina
TPS-T10-2	**Design of a novel hybrid sensor for heavy metal and pH monitoring based on wireless sensor system**	**# 10 Hybrid Devices**	**Hao Wan, Da Ha, Xu Wang, Qiyong Sun, Haibo Li, Ning Xu, Ping Wang *presenter is Hao Wang***	A novel hybrid sensor integrated with microelectrode array (MEA), light addressable potentiometric sensor (LAPS) and sharing counter electrode was designed for heavy metal and pH monitoring, while extern reference electrode was introduced individually. MEA was deployed and characterized for determination of zinc, lead and copper by cyclic voltammetry and stripping voltammetry. Meanwhile, the electrochemical performance of pH in LAPS was principally studied with sensitivity of 52.1mV/pH. Measuring modules and sampling modules were deployed in the wireless sensor system for auto-detection and auto-sampling which light module was used for light source modulation. The wireless sensor system could be applied for monitoring of heavy metal and pH in aquatic environment.	Biosensor National Special Laboratory, Department of Biomedical Engineering, Zhejiang University, Hangzhou, 310027, P. R. China	P.R China