ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

Electrochemical Sensors and Biosensors Group
HTTP://LAC-SENSOR.LAB.UOI.GR

Laboratory of
Analytical Chemistry

Department of Chemistry
University of Ioannina

Ioannina, Greece

Electrochemical Sensors and Biosensors Group

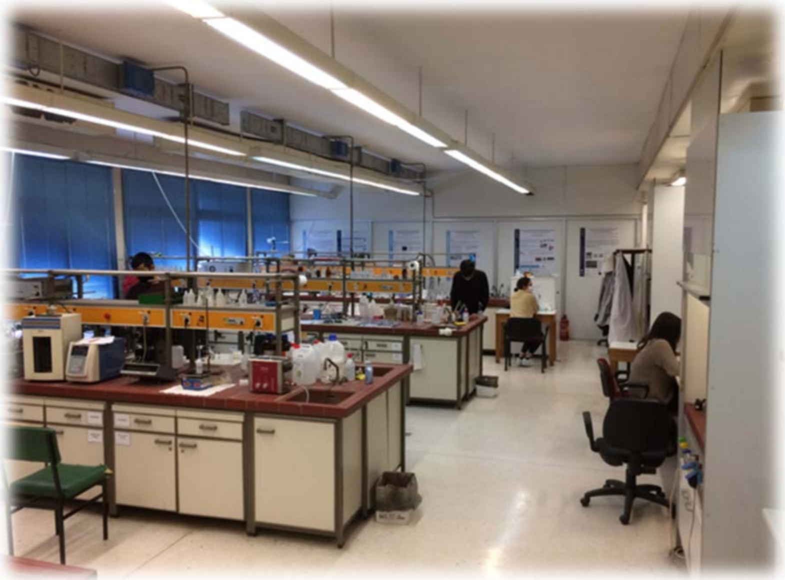
www.lac-sensor.lab.uoi.gr

Prof. Mamas I. Prodromidis

INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

Premises

Our group occupies a space of about 120 m^2, which is consisted of two independent laboratories: The main laboratory (70 m^2), and the “Screen-printing Unit” (52 m^2) both located at the main building of the Department of Chemistry.

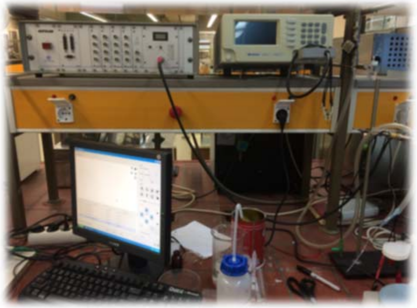


Laboratory

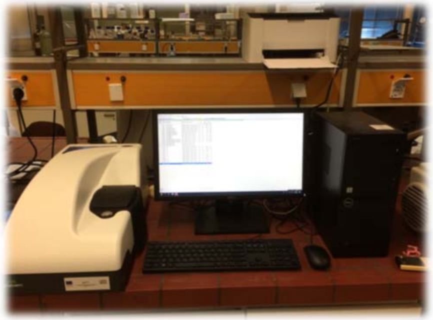
Screen-printing Unit

The laboratory

Frequency Response analyzer
Impedance Spectroscopy



Potentiostat – Galvanostat – LCR
(Cyclic) Voltammetry - Potentiometry



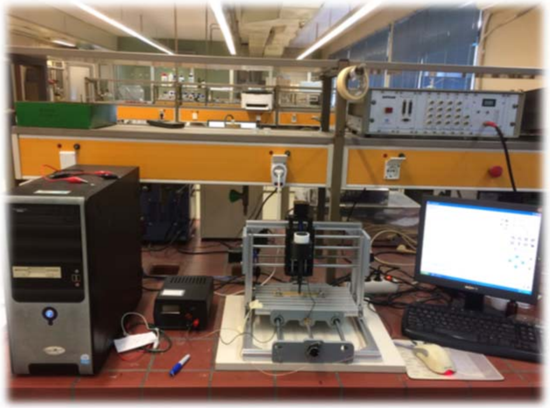
DLS - Malvern

Quartz Crystal Microbalance (QCM)

Stereoscope – 680x

Centrifuge – 10k rpm

Ultrasonic probe 200 W
Exfoliation of layered materials



3D-Electric Discharge Unit
Topospecific generation of nanoparticles

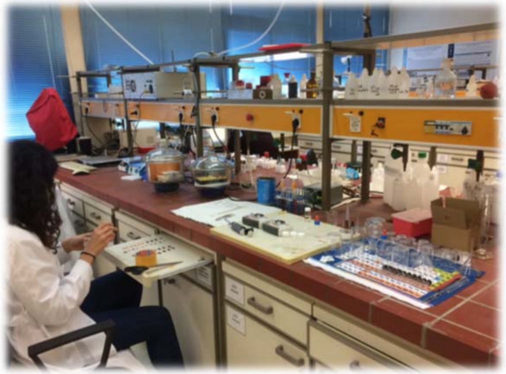
ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

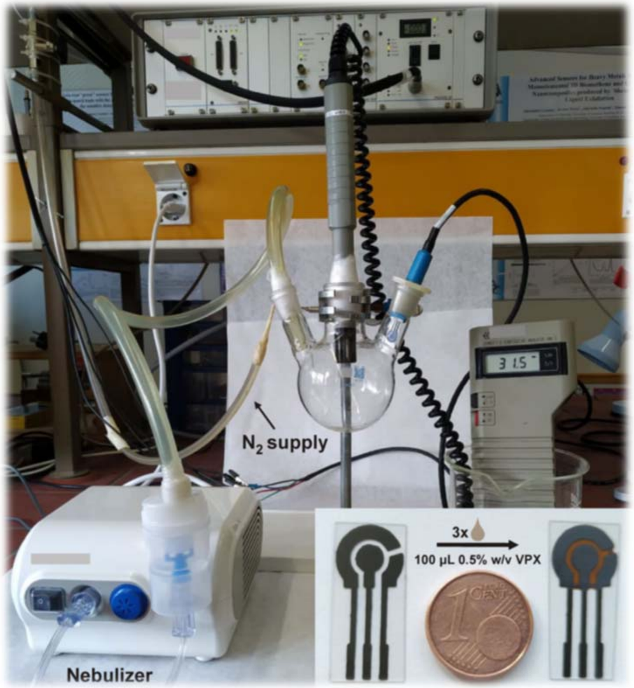
UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

The laboratory





INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

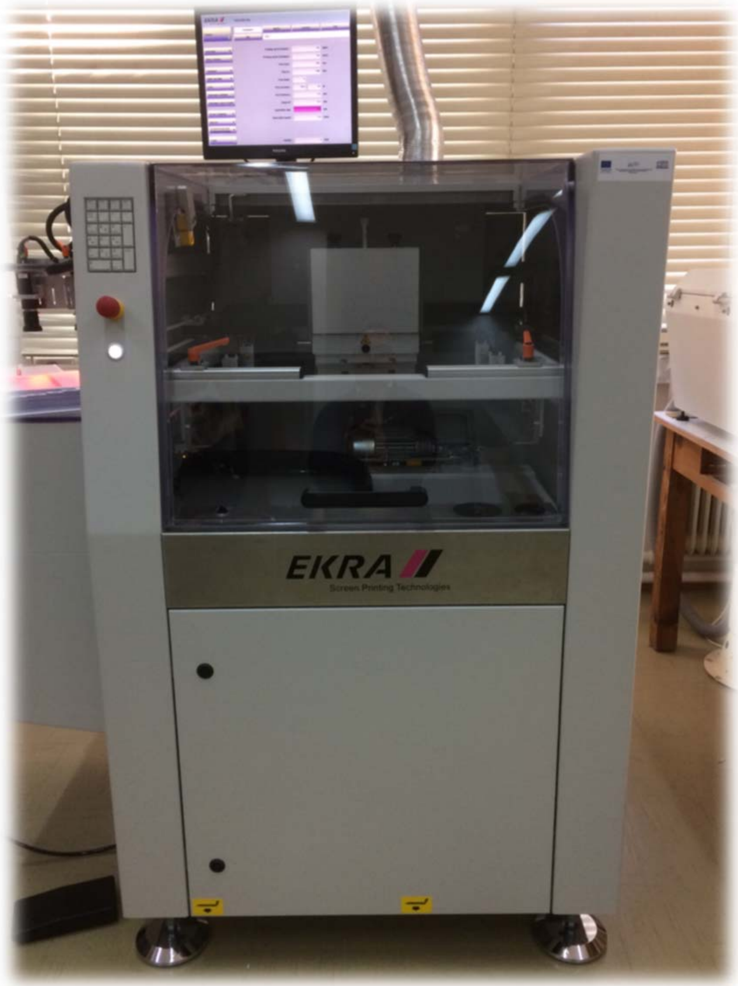
ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP
HTTP://LAC-SENSOR.LAB.UOI.GR

Screen-printing Unit

Pneumatic mesh stretching table

Exposure unit (UV)



Screen-printer with laser automatic alignment

IR-belt oven

INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

Screen-printing Unit – casting of thin films

Automatic wet-film applicator (1-50 mil), Temp. 180 ^{0}C

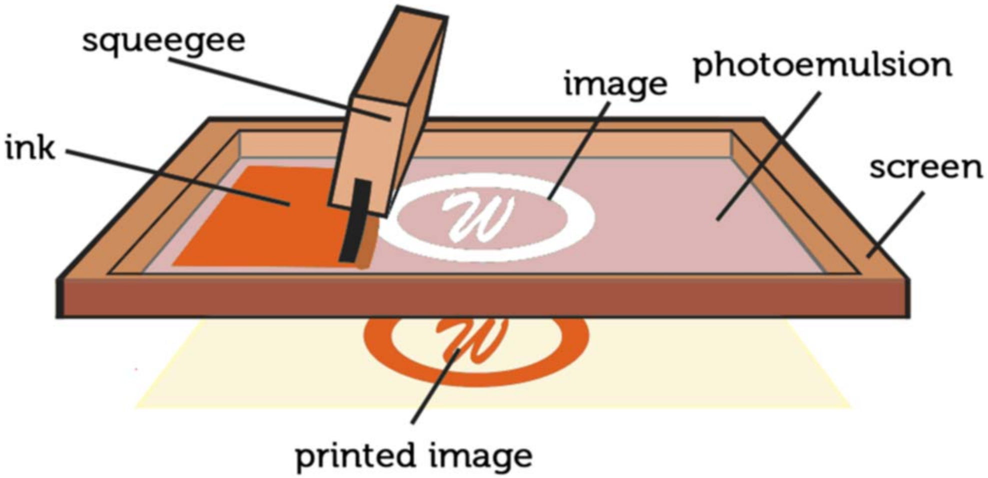
Planetary de-foaming mixing unit

Thickness meter (0.1 μm)

Incubator (0-50 ^{o}C)

INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

Screen-printing: Principle of operation



The ink is driven under pressure through a screen (mask), passes through the holes (image) made over a photosensitive layer, and so it printed-out over a substrate located underneath the screen.

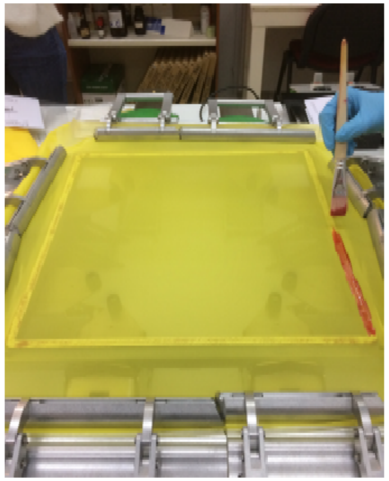
ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

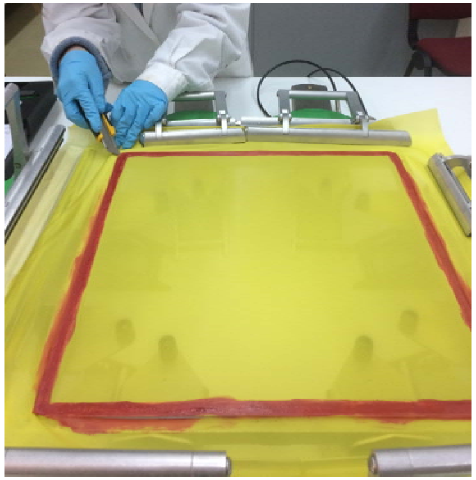
UNIVERSITY OF IOANNINA

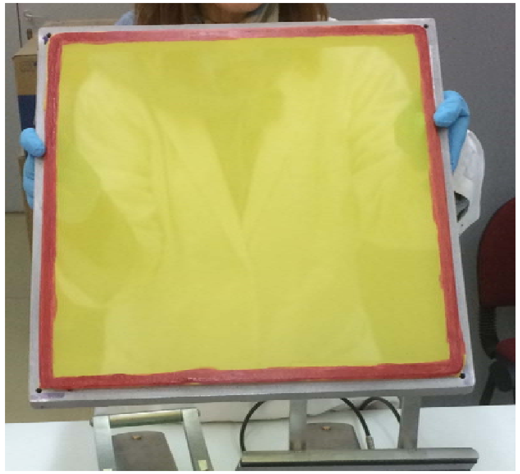
ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

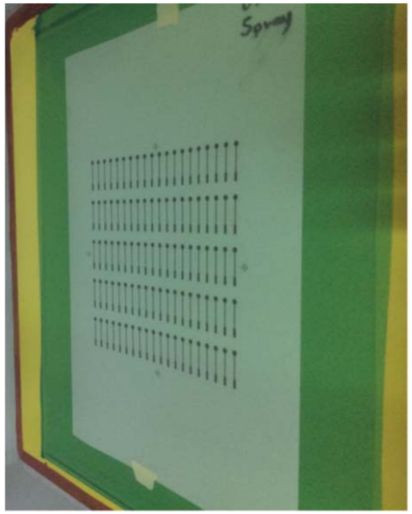
HTTP://LAC-SENSOR.LAB.UOI.GR

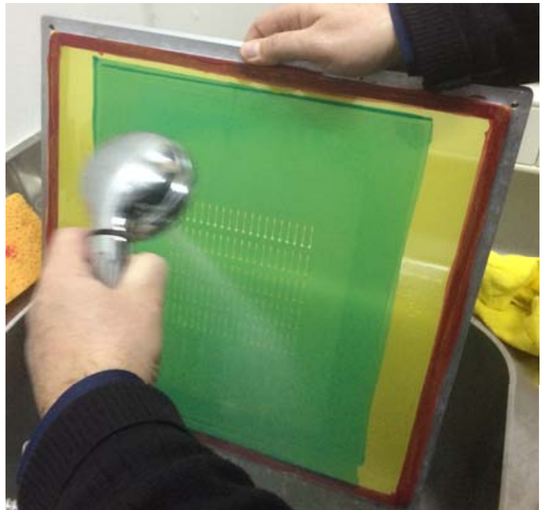
Preparation of screens











MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP
HTTP://LAC-SENSOR.LAB.UOI.GR

Research interest

Our group is integrated within the area of Chemical Sensors and Biosensors and its main research interests include the development of enzyme biosensors, impedimetric biosensors, the design, development and fabrication of disposable electrochemical cells for application in clinical, food and environmental chemistry, the generation of metal nanoparticles with "green" methods, bipolar electrochemistry as well as the development of portable analytical devices for point-of-care applications.

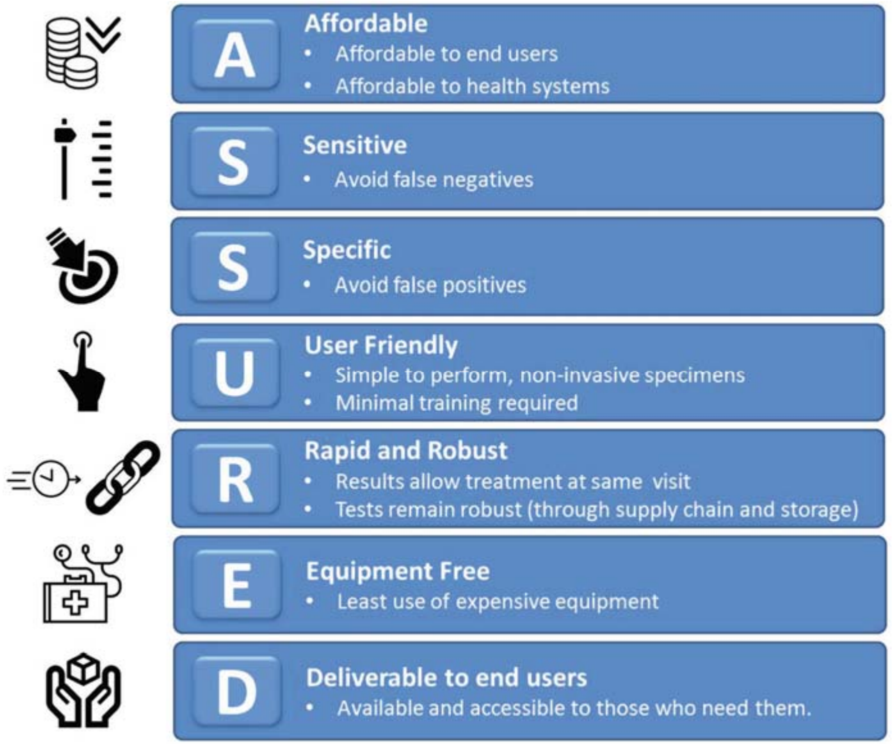
- ✓ **Point-of-care medical diagnostic devices**
- ✓ **Responsive polymer film-based biosensors**
- ✓ **Immobilization of enzymes and antibodies**
- ✓ **Voltammetric biosensors**
- ✓ **Impedimetric chemical sensors, immunosensors and gas-phase sensors**
- ✓ **"Green" generation of metal or graphite nanomaterials by spark discharge**
- ✓ **Production and electrocatalysis with 2D nanosheets (ILMs)**
- ✓ **Screen-Printed electrochemical cells**
- ✓ **Bipolar electrochemistry**

INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA
Electrochemical Sensors and Biosensors Group
HTTP://LAC-SENSOR.LAB.UOI.GR

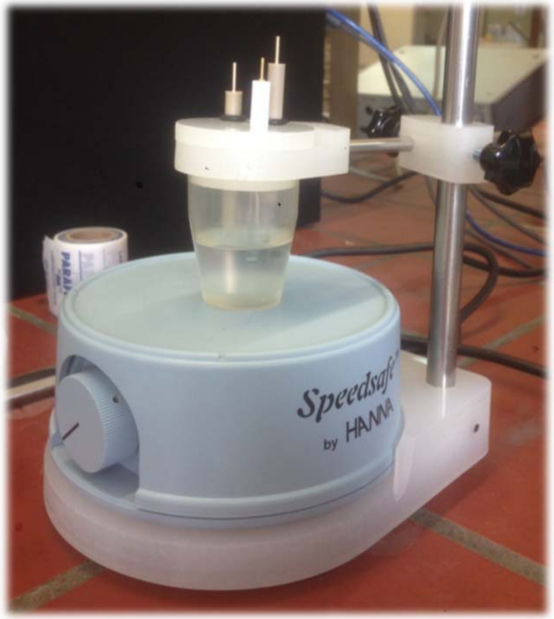
Analysis & Diagnostics: The way forward

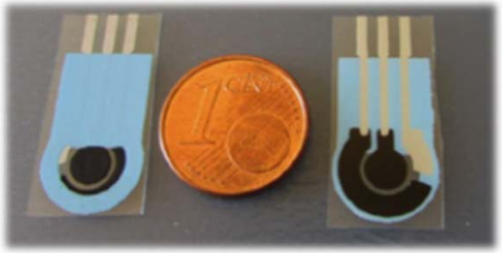
*The "**ASSURED**" criteria set by the World Health Organization is a top priority in medical, food and environmental diagnostic sector.*
***Target**: The development of inexpensive devices allowing reliable measurements to be conducted by non-trained users outside a laboratory facility*



INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

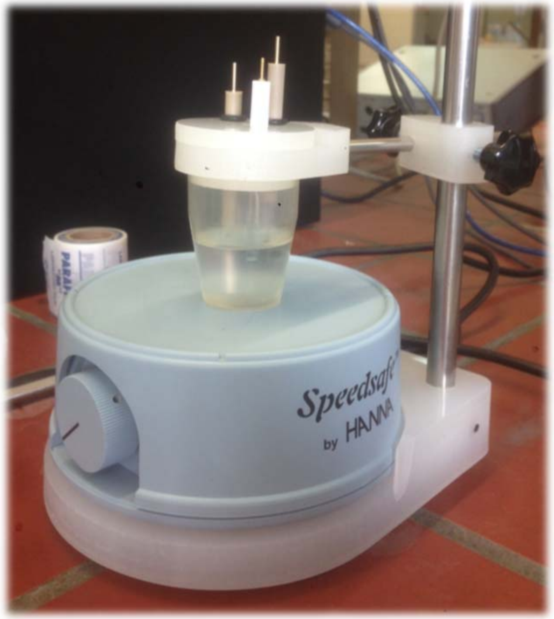
Miniaturization

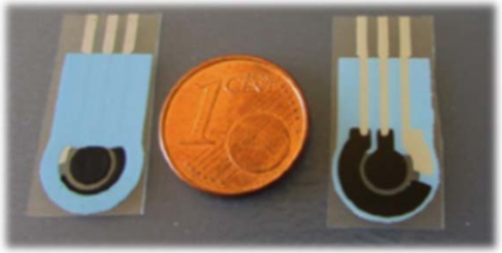


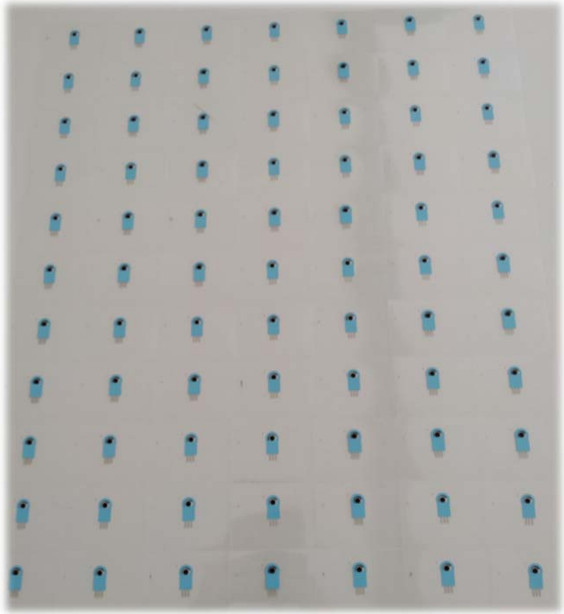


ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA
Electrochemical Sensors and Biosensors Group
http://lac-sensor.lab.uoi.gr

Miniaturization – mass production of low-cost disposable sensors





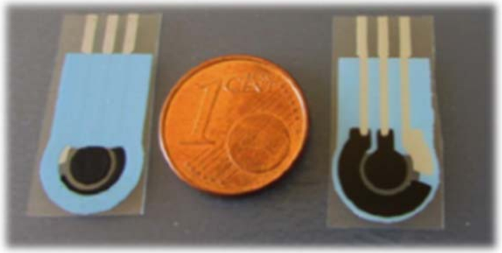


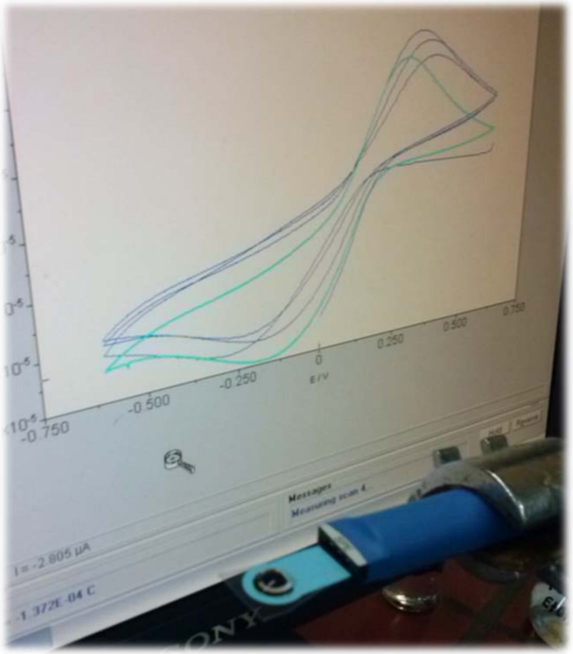
INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP
HTTP://LAC-SENSOR.LAB.UOI.GR

Drop-volume measurements





INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

All-screen-printed electrodes integrating permanent bonded magnets

Electrochimica Acta 360 (2020) 136981

Contents lists available at ScienceDirect

Electrochimica Acta

journal homepage: www.elsevier.com/locate/electacta

All-screen-printed graphite sensors integrating permanent bonded magnets. Fabrication, characterization and analytical utility

Anastasios V. Papavasileiou[a], Ioannis Panagiotopoulos[b,c], Mamas I. Prodromidis[a,c,*]

[a] Department of Chemistry, University of Ioannina (UoI), Ioannina 45110, Greece
[b] Department of Material Science and Engineering, UoI, Ioannina 45110, Greece
[c] Institute of Materials Science and Computing, University Research Center of Ioannina (URCI), 45110, Ioannina, Greece

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

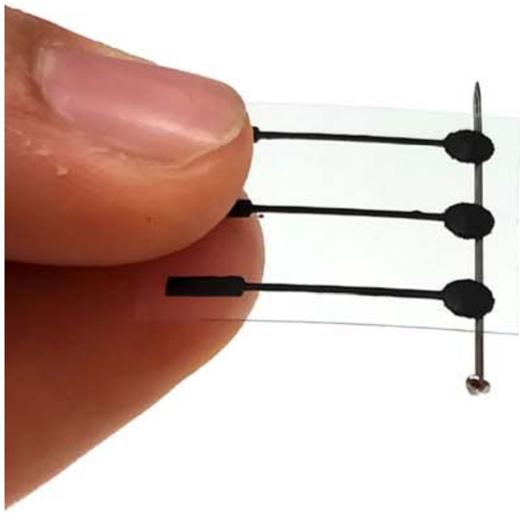
UNIVERSITY OF IOANNINA

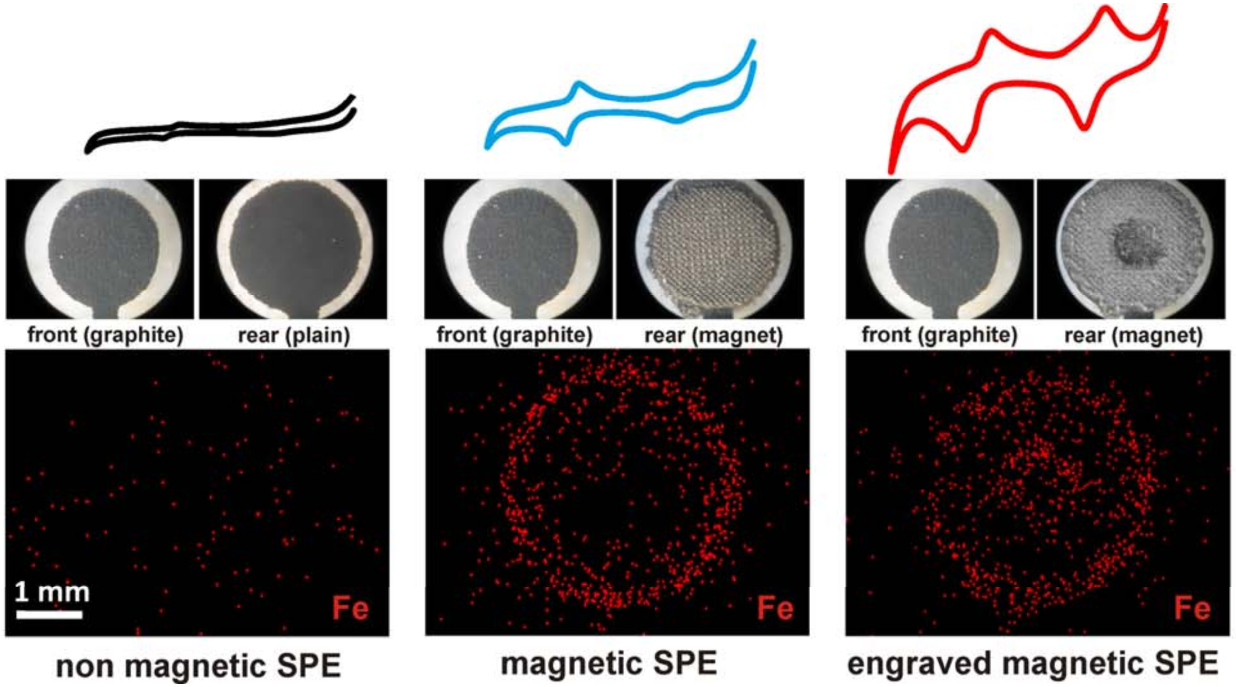
ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

All-screen-printed electrodes integrating permanent bonded magnets

magnetic SPE/Fe_3O_4/PB





INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

Research Outputs & Prototypes: Portable potentiostat

ELSEVIER

Available online at www.sciencedirect.com

SCIENCE DIRECT•

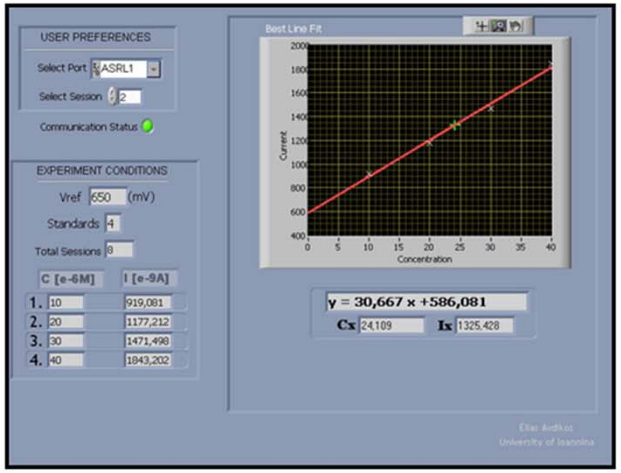
Sensors and Actuators B 107 (2005) 372–378

SENSORS AND ACTUATORS B CHEMICAL

www.elsevier.com/locate/snb

Construction and analytical applications of a palm-sized microcontroller-based amperometric analyzer

Elias M. Avdikos[a], Mamas I. Prodromidis[a,*], Constantinos E. Efstathiou[b]



1

INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

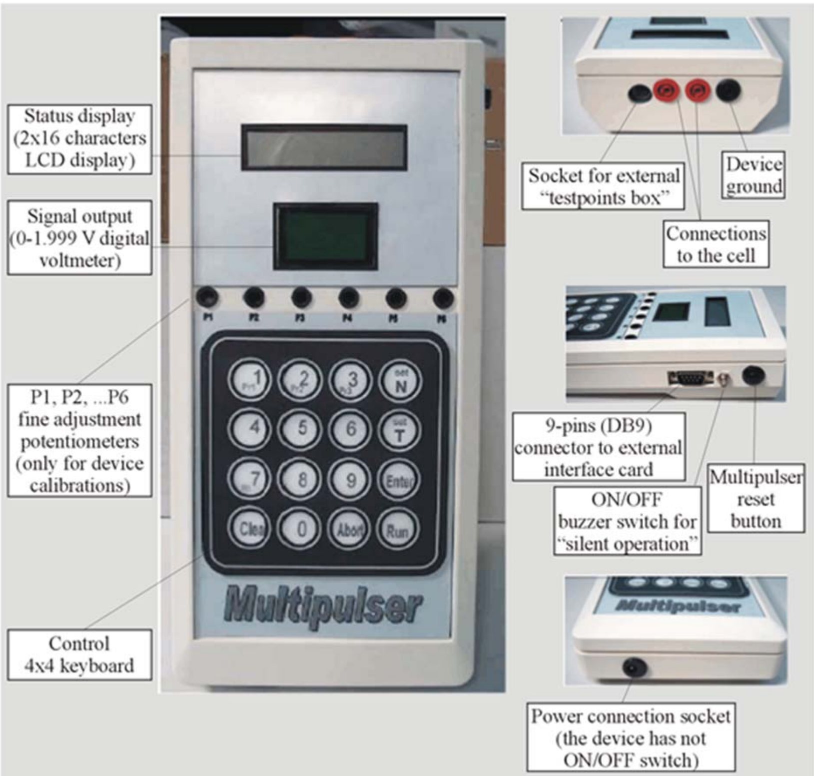
ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP
HTTP://LAC-SENSOR.LAB.UOI.GR

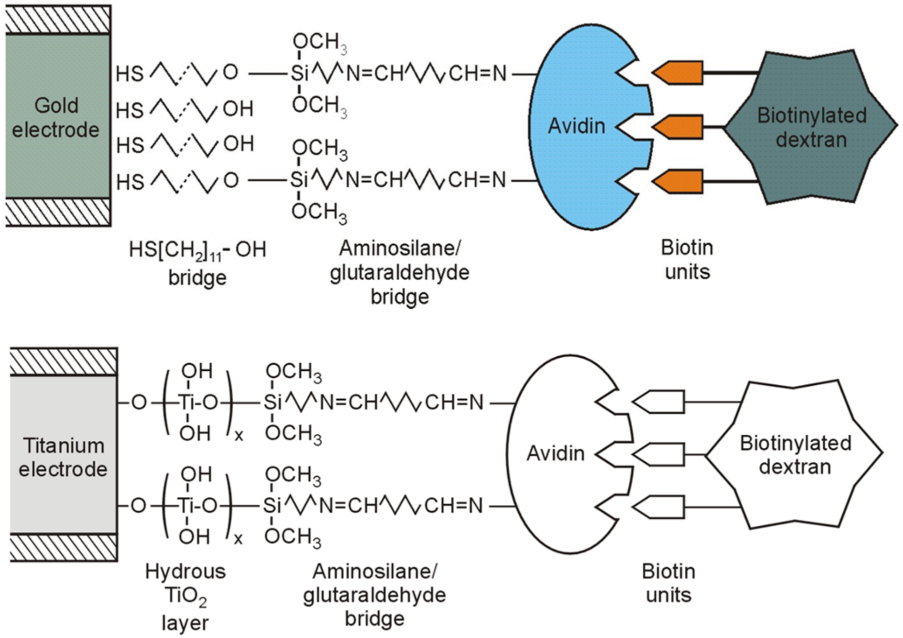
Research Outputs & Prototypes: Portable charge (capacitance or impedance) meter

ELSEVIER
Available online at www.sciencedirect.com
SCIENCE DIRECT
Sensors and Actuators B 114 (2006) 47–57
SENSORS ACTUATORS B CHEMICAL
www.elsevier.com/locate/snb

Monitoring of the avidin–biotinylated dextran interaction on Au- and Ti/TiO_2-electrode surfaces using a charge integrating device

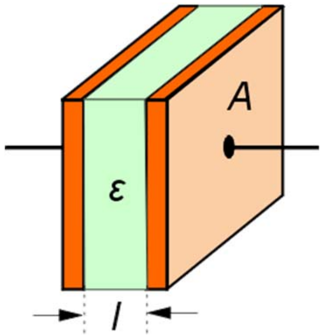
Spiros D. Bolis[a], Panagiota C. Charalambous[a], Constantinos E. Efstathiou[a,*], Aikaterini G. Mantzila[b], Constantina A. Malamou[b], Mamas I. Prodromidis[b]



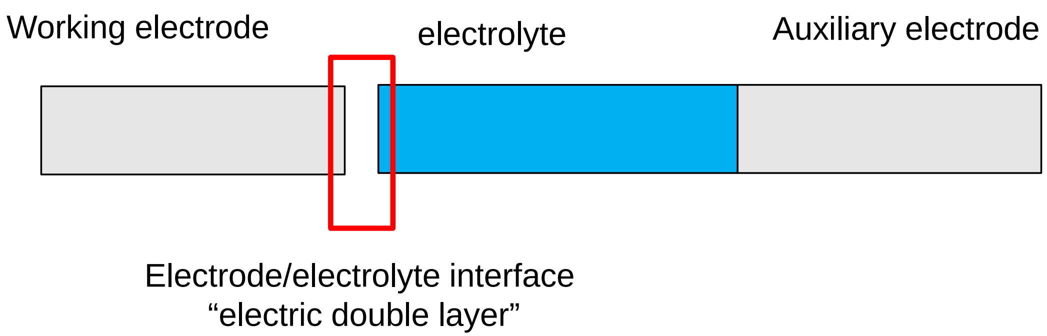


INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

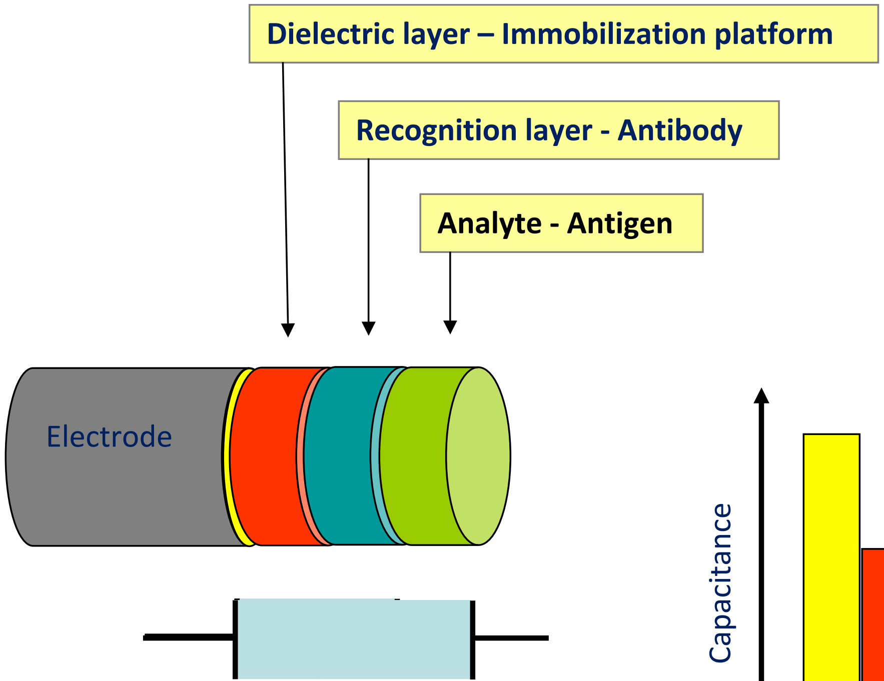
The model of a biochemical capacitor

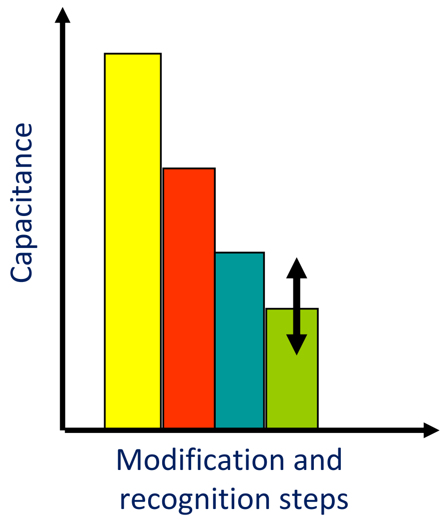


$$C = \frac{Q}{V} = \frac{\text{Surface } (A) \times \text{permittivity } (\varepsilon) \times \text{permittivity of free space } (\varepsilon_o)}{\text{Distance } (L)}$$



The model of a biochemical capacitor





ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

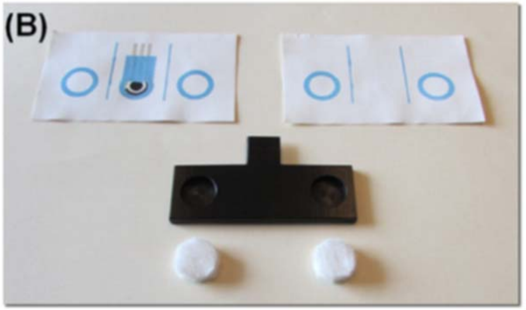
ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP
HTTP://LAC-SENSOR.LAB.UOI.GR

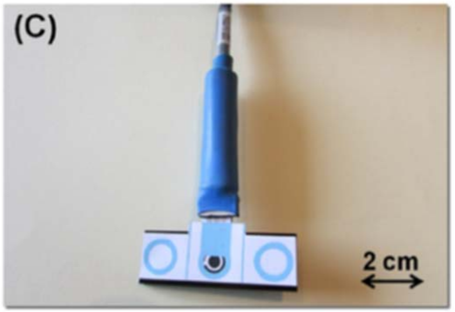
Research Outputs & Prototypes: Paper-based biosensor for goat milk adulteration

analytical chemistry
DOI: 10.1021/acs.analchem.6b01625
Anal. Chem. 2016, 88, 6897−6904
Article
pubs.acs.org/ac

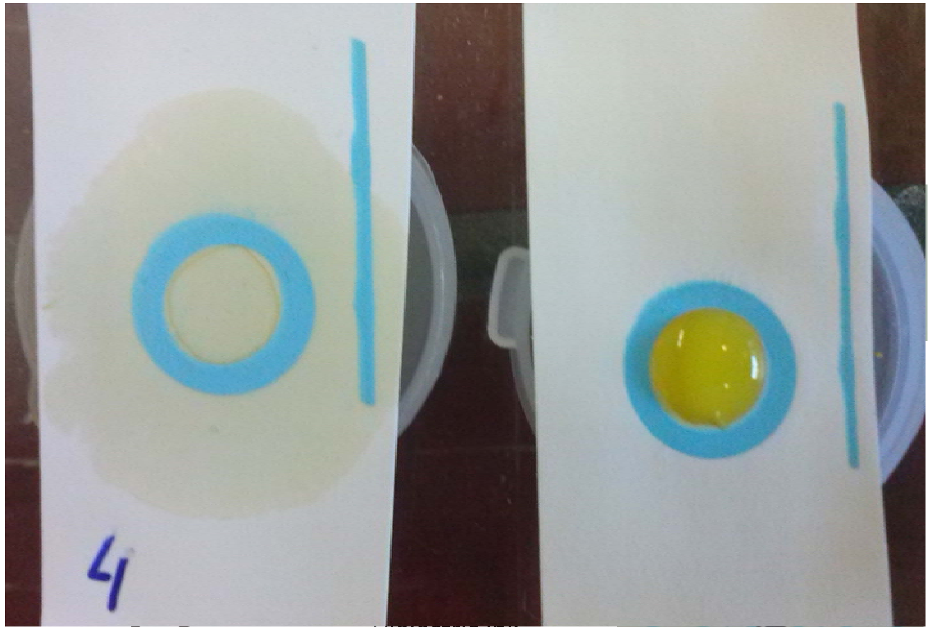
Lab-on-a-Membrane Foldable Devices for Duplex Drop-Volume Electrochemical Biosensing Using Quantum Dot Tags

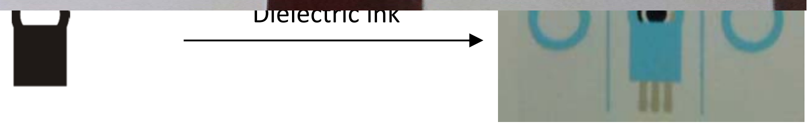
Christos Kokkinos,*,† Michailia Angelopoulou,§ Anastasios Economou,*,† Mamas Prodromidis,‡ Ageliki Florou,‡ Willem Haasnoot,⊥ Panagiota Petrou,§ and Sotirios Kakabakos§





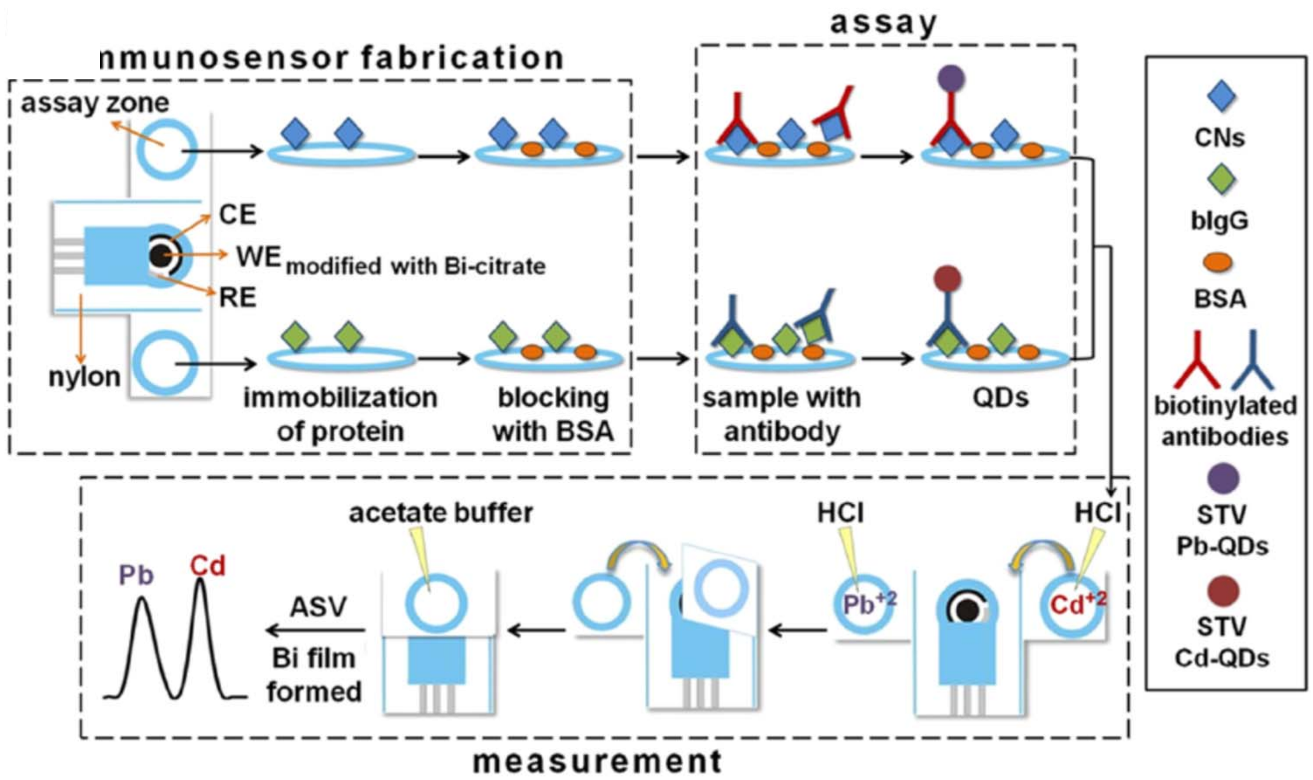
(B) Photograph of both sides of the membrane and of the PVC holder along with the hydrophilic tabs used for the collection of the liquid waste. (C) Photograph of the complete device (membrane mounted on the PVC holder) plugged into the cable connecting to the potentiostat.





INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

Research Outputs & Prototypes: Paper-based biosensor for goat milk adulteration



Schematic illustration of the duplex protein immunosensing, including the biofunctionalization of the assay zones, the steps of competitive immunossays and the ASV detection.

Markers for goat milk adulteration
CNs : bovine milk caseins; **bIgG** : bovine immunoglobulin G

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

Research Outputs & Prototypes: Bipolar electrochemistry

Sensors and Actuators B 268 (2018) 529–534

Contents lists available at ScienceDirect

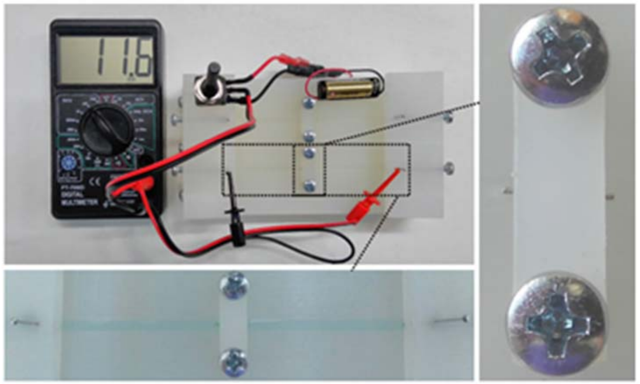
Sensors and Actuators B: Chemical

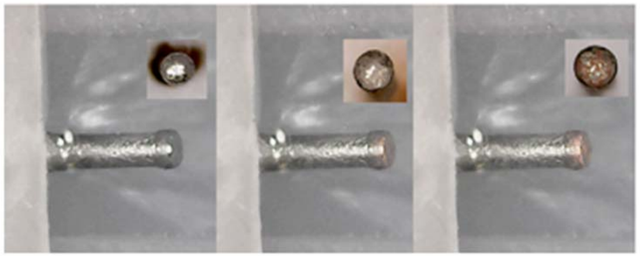
journal homepage: www.elsevier.com/locate/snb

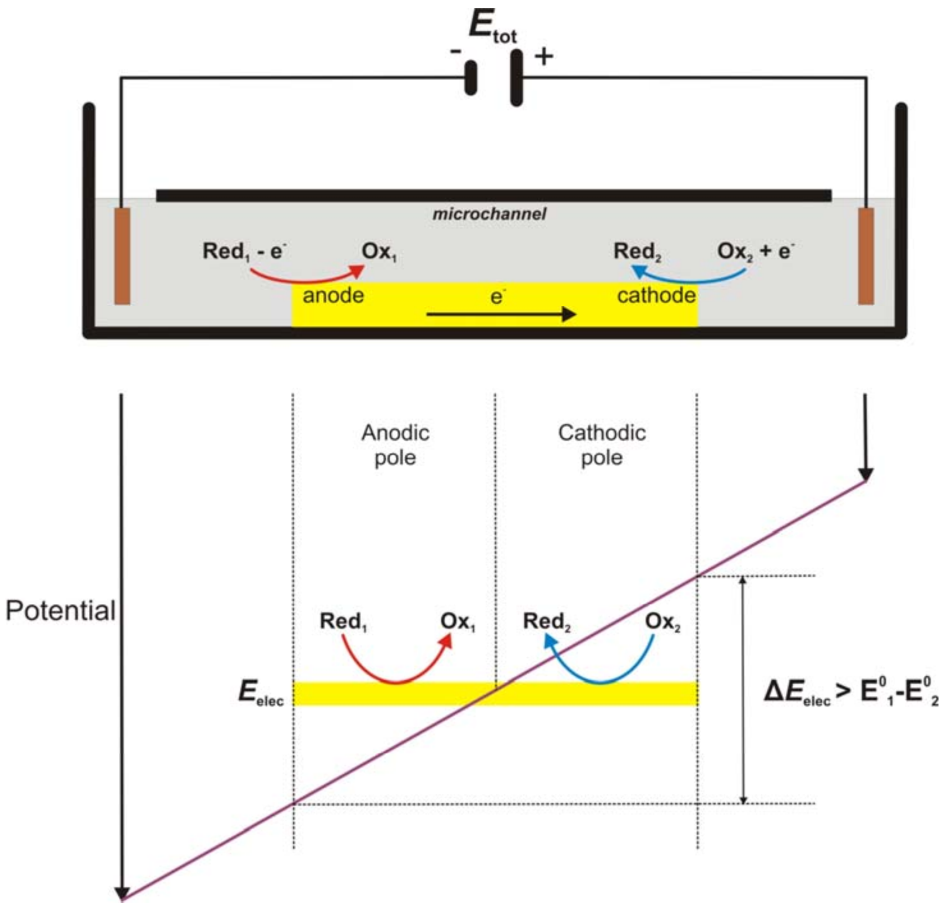
ELSEVIER

Bipolar electrochemical detection of reducing compounds based on visual observation of a metal electrodeposited track at the onset driving voltage

Antonios P. Hadjixenis[a], Jan Hrbac[b], Mamas I. Prodromidis[a,*]







INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

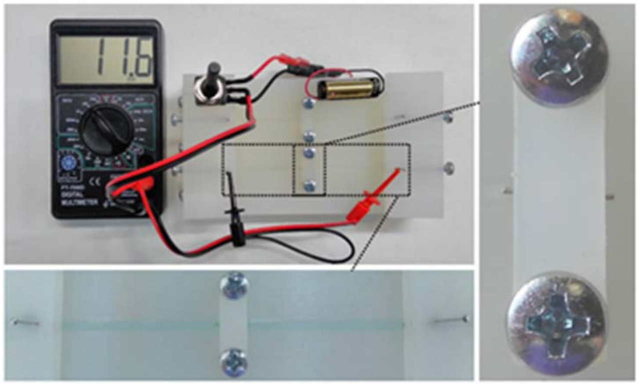
ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP
HTTP://LAC-SENSOR.LAB.UOI.GR

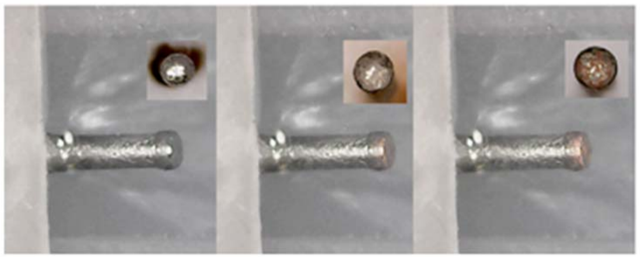
Research Outputs & Prototypes: Bipolar electrochemistry

Sensors and Actuators B 268 (2018) 529–534
Contents lists available at ScienceDirect
Sensors and Actuators B: Chemical
journal homepage: www.elsevier.com/locate/snb
ELSEVIER

Bipolar electrochemical detection of reducing compounds based on visual observation of a metal electrodeposited track at the onset driving voltage

Antonios P. Hadjixenis[a], Jan Hrbac[b], Mamas I. Prodromidis[a,*]





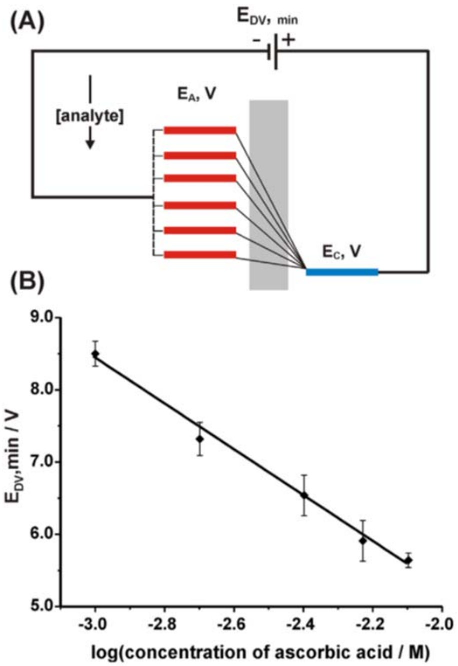
Minimum Driving Voltage ($E_{DV,min}$) = K ($E_A - E_C$)

$$E_A = [E^0_{(O_2,\ H_2O)} - \frac{0.05916}{4} \log \frac{1}{[H^+]^4}] + \eta_A \qquad E_C = [E^0_{(Cu(II)/Cu(0))} - \frac{0.05916}{2} \log \frac{1}{[Cu^{2+}]}] - \eta_C$$

(in the absence of any reducing compound)

$$E_A = [E^0_{(AA/DHA)} - \frac{0.05916}{2} \log \frac{[AA]}{[DHA]}] + \eta_A$$

(in the presence of, for example, ascorbic acid, AA. (DHA, dehydroascorbic acid).



INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

Research Outputs & Prototype: Determination of total antioxidant capacity

Talanta 219 (2020) 121313

Contents lists available at ScienceDirect

Talanta

journal homepage: www.elsevier.com/locate/talanta

ELSEVIER

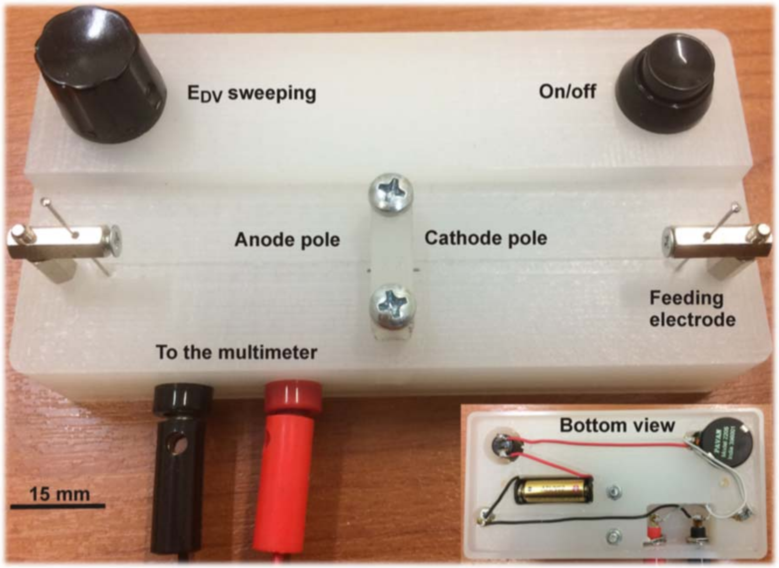
Short communication

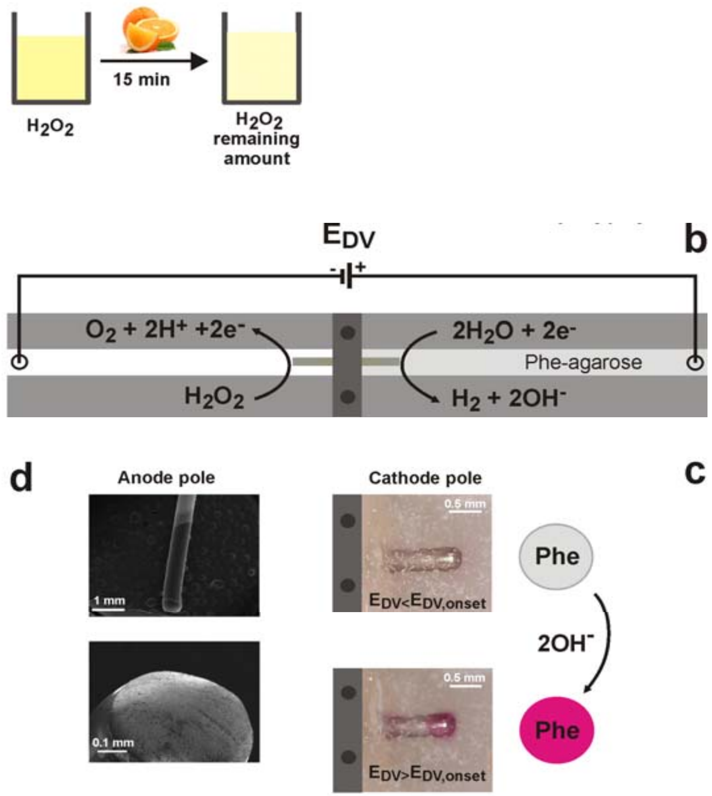
A compact bipolar electrochemistry device utilizing a liquid free catholyte and eye visual indication of the reporting event for the determination of antioxidant capacity in real-world samples

Antonios P. Hadjixenis[a], Jan Hrbac[b], Mamas I. Prodromidis[a,*]

[a] Department of Chemistry, University of Ioannina, Ioannina, 451 10, Greece

[b] Department of Chemistry, Masaryk University, Brno, 625 00, Czech Republic





INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

Electrochemical Sensors and Biosensors Group
http://lac-sensor.lab.uoi.gr

Research Outputs & Prototypes: 3D-spark discharge nanoparticle generator

Electrochimica Acta 304 (2019) 292–300

Contents lists available at ScienceDirect

Electrochimica Acta

journal homepage: www.elsevier.com/locate/electacta

ELSEVIER

Extended coverage of screen-printed graphite electrodes by spark discharge produced gold nanoparticles with a 3D positioning device. Assessment of sparking voltage-time characteristics to develop sensors with advanced electrocatalytic properties

Check for updates

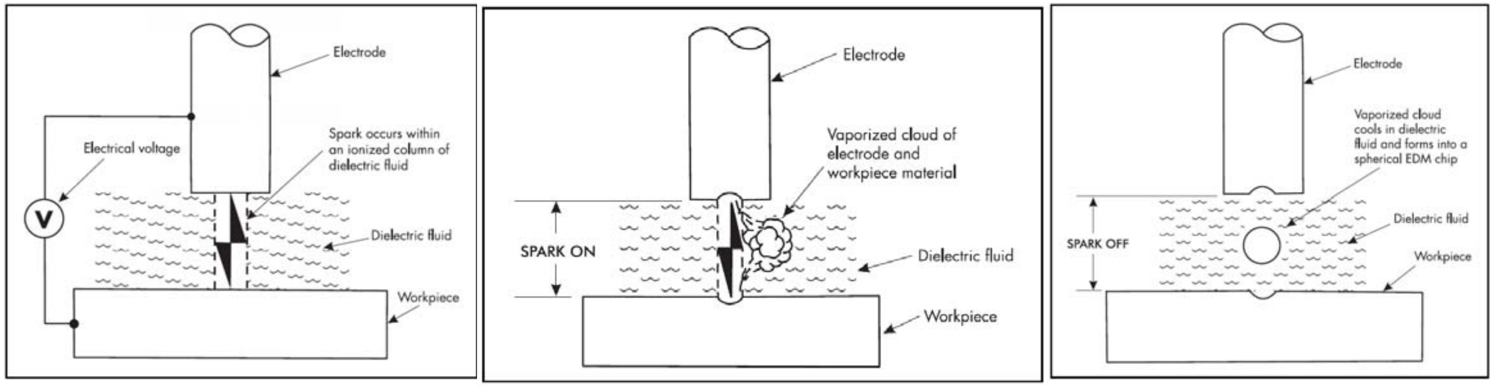
Maria G. Trachioti [a], Eleni I. Tzianni [a], Daniel Riman [b], Jana Jurmanova [c], Mamas I. Prodromidis [a, *], Jan Hrbac [b, d, **]

[a] *Department of Chemistry, University of Ioannina, Ioannina, 451 10, Greece*
[b] *Department of Analytical Chemistry, Palacky University, Faculty of Science, 17. listopadu 12, CZ-771 46, Olomouc, Czech Republic*
[c] *Department of Physical Electronics, Masaryk University, Kotlarska 2, 611 37, Brno, Czech Republic*
[d] *Institute of Chemistry, Faculty of Science, Masaryk University, Kamenice 5, 625 00, Brno, Czech Republic*

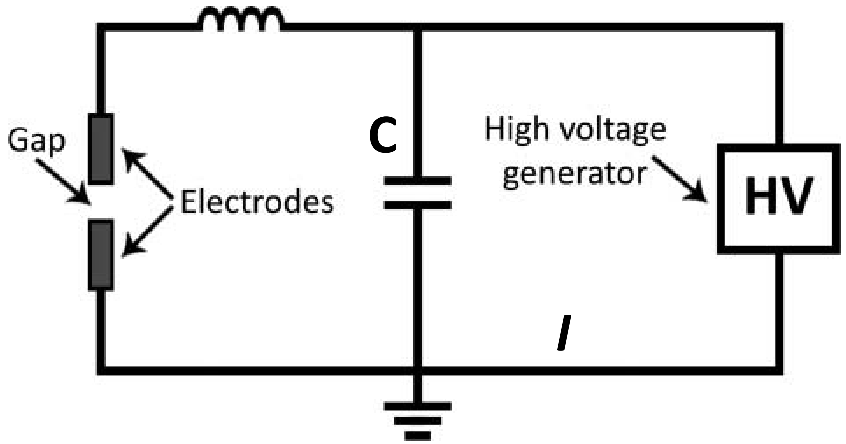
INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

Research Outputs & Prototypes: 3D-spark discharge nanoparticle generator

- High voltage between two conductors (and to a neutral gas between them)
- Electric breakdown (flow of current through the electric insulator)
- Formation of a conductive plasma (electrons, ionized species) column
- Development of high temperatures (> 20000 K) at the sparking point.
- Erosion of both materials (conductors) – melted and evaporated particles
- Formation of a vaporized cloud
- Cooling process & formation of nanoparticles



3D-spark discharge nanoparticle generator: The basics of the electrical system



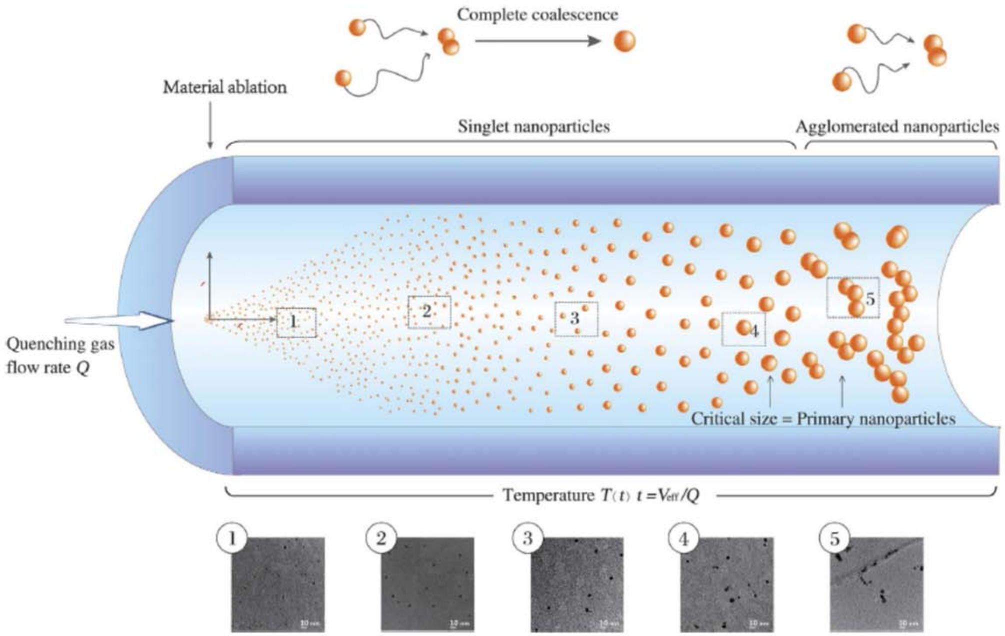
$$E = \frac{1}{2} C V_d^2$$

The capacitance (***C***) is also related to the energy (***E***) of the spark.

$$f = \frac{I}{C V_d}$$

The frequency (***f***) of the spark is controlled by the charging current (***I***) of the capacitor; ***C***, capacitance; ***Vd***, discharge voltage

Wide scope of applicability, tunable size of NPs, controllable composition

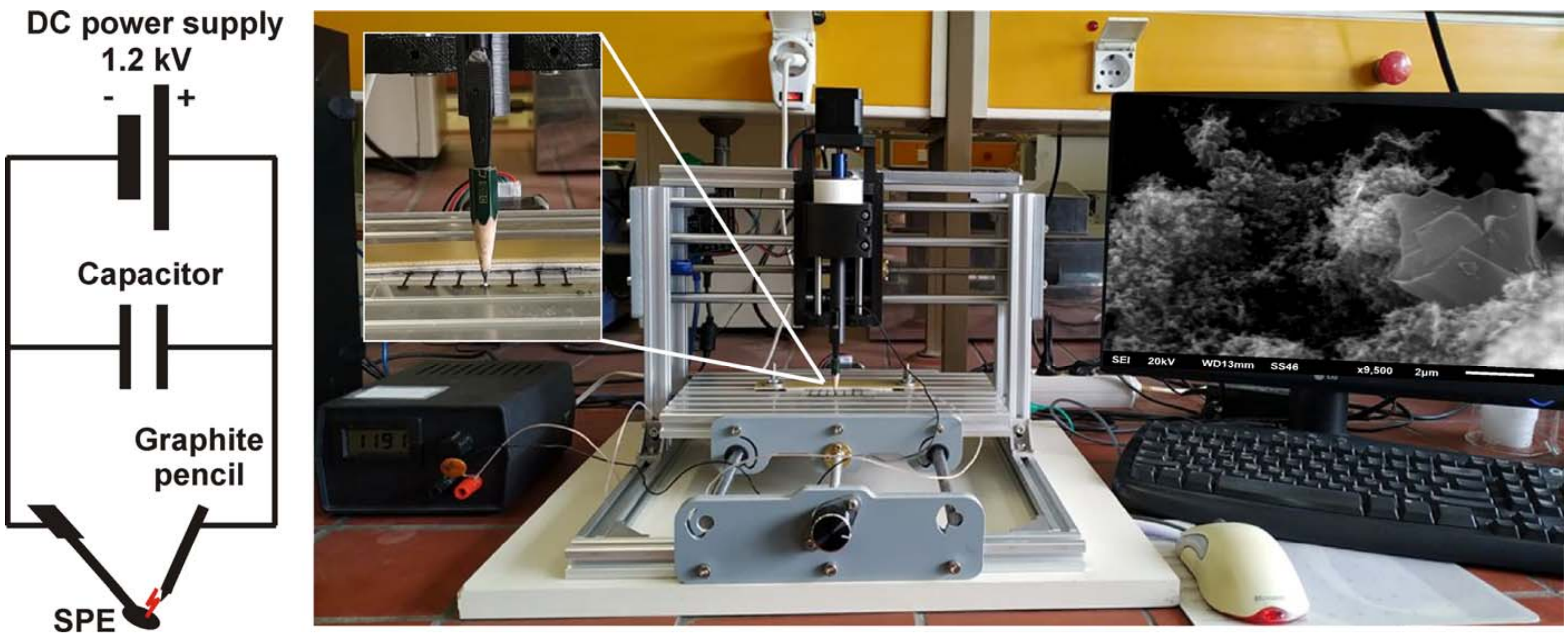


- ✓ In the case of **alloyed electrodes**, the relative concentration of the elements in the nanoparticulate sample was consistent with the electrode composition.
- ✓ When using electrodes of **different metals** the individual nanoparticles showed a range of mixing ratios.
- ✓ Applicable to all metals and semi contactors.

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP
HTTP://LAC-SENSOR.LAB.UOI.GR

In-situ, pin-to-substrate 3D-spark discharge nanoparticle generator

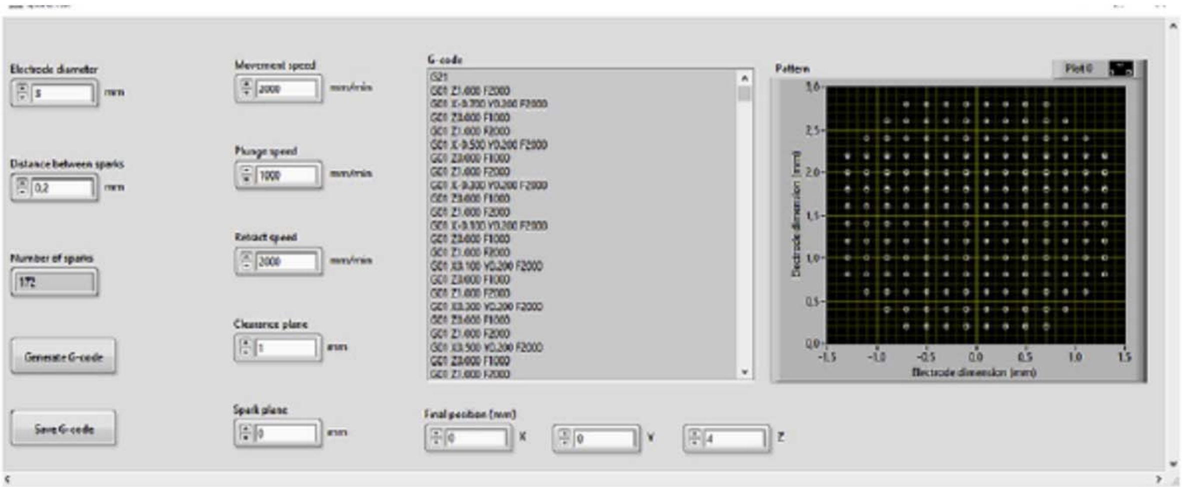


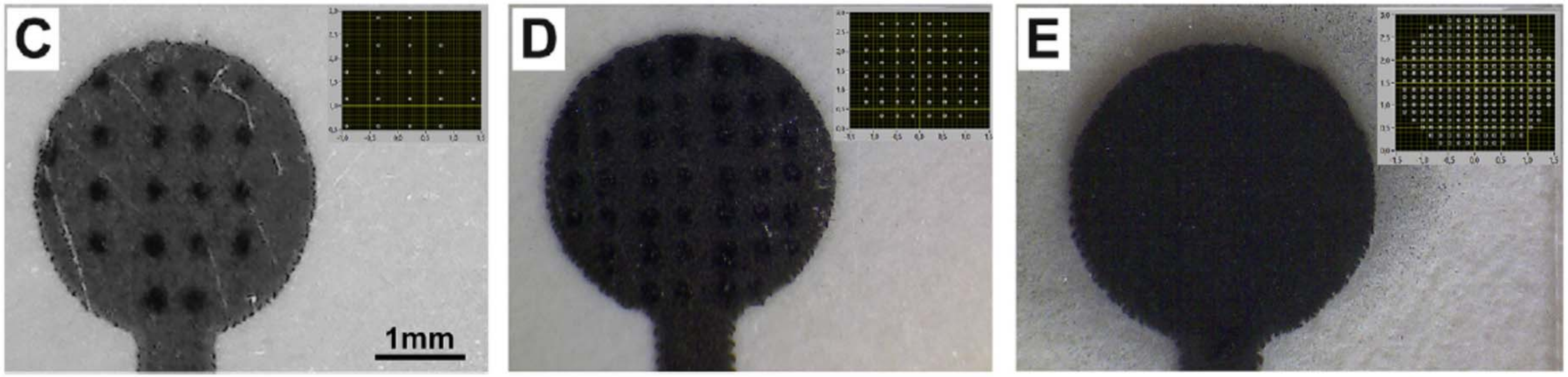
INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP
HTTP://LAC-SENSOR.LAB.UOI.GR

Toposelective modification of the electrode surface





INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

Works made in our lab

Sparked (single or mixed) metal or graphite nanomaterial-modified SPEs can be prepared on-demand, even on-site, within a few minutes or even seconds, through a totally green and solution-free methodology that requires only the respective metal/alloy/carbon wire and a power supply. Sensors based of various nanomaterials, such as **Bi** [1,2], **Cu**, **Ni** and **alloyed Cu/Ni** [3], **Sn** [4], **Au** or **Au/Si** [5,6], **Fe** [7], **Mo** [8] and **C** [9] nanomaterials have been developed.

References

[1] D. Riman, D. Jirovsky, J. Hrbac, M.I. Prodromidis, Electrochem. Commun. 50 (2015) 20.
[2] D. Riman, A. Avgeropoulos, J. Hrbac, M.I. Prodromidis, Electrochim. Acta 165 (2015) 410.
[3] D. Riman, K. Spyrou, A.E. Karantzalis, J. Hrbac, M.I. Prodromidis, Talanta 165 (2017) 466.
[4] M. Trachioti, J. Hrbac, M.I. Prodromidis, Sens. Actuators B 260 (2018)1076.
[5] M. Trachioti, A. Karantzalis, J. Hrbac, M.I. Prodromidis, Sens. Actuators B 281(2019) 273.
[6] M. Trachioti, E. Tzianni, D. Riman, J. Jurmanova, M. Prodromidis, J. Hrbac, Electrochim. Acta 304 (2019) 292.
[7] F. Tseliou, P. Pappas, K. Spyrou, J. Hrbac, M.I. Prodromidis, Biosens. Bioelectron. 132 (2019)136.
[8] P-A. Kolozof, A.B. Florou, K. Spyrou, J. Hrbac, M.I. Prodromidis, Sens. Actuators B 304 (2020) 127268.
[9] M.G. Trachioti, D. Hemzal, J. Hrbac, M.I. Prodromidis, Sens. Actuators B 310 (2020) 127871.

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

Works made in our lab

Sensors & Actuators: B. Chemical 281 (2019) 273–280

Contents lists available at ScienceDirect

Sensors and Actuators B: Chemical

journal homepage: www.elsevier.com/locate/snb

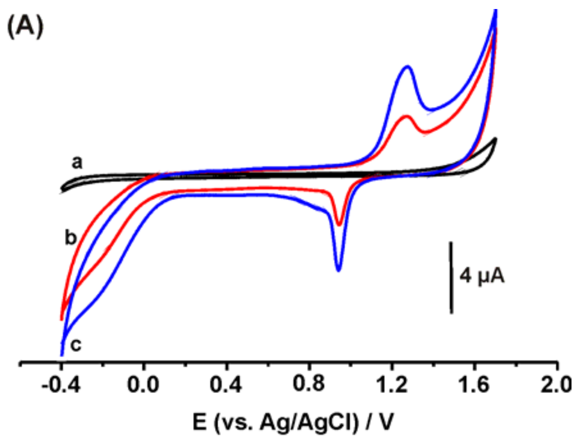
ELSEVIER

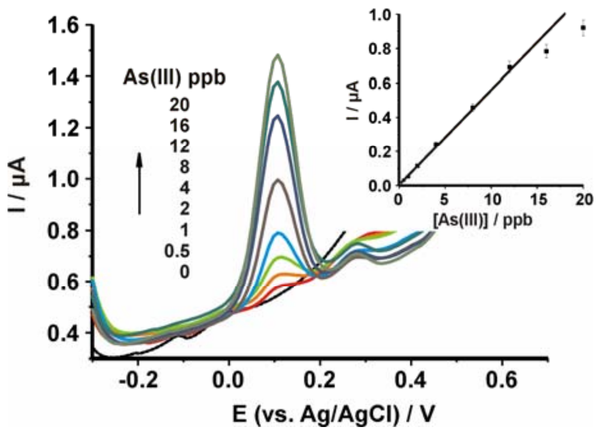
Low-cost screen-printed sensors on-demand: Instantly prepared sparked gold nanoparticles from eutectic Au/Si alloy for the determination of arsenic at the sub-ppb level

Check for updates

Maria G. Trachioti[a], Alexandros E. Karantzalis[b], Jan Hrbac[c], Mamas I. Prodromidis[a,*]

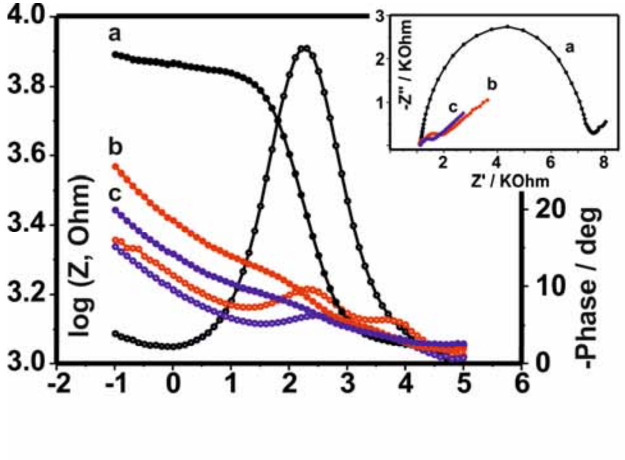
[a] *Department of Chemistry, University of Ioannina (UoI), Ioannina, 45110, Greece*
[b] *Department of Materials Science and Engineering, UoI, Ioannina, 451 10, Greece*
[c] *Department of Chemistry, Masaryk University, 625 00, Brno, Czech Republic*

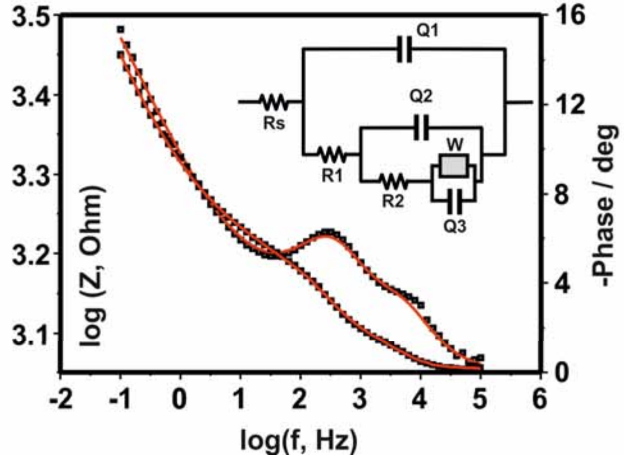


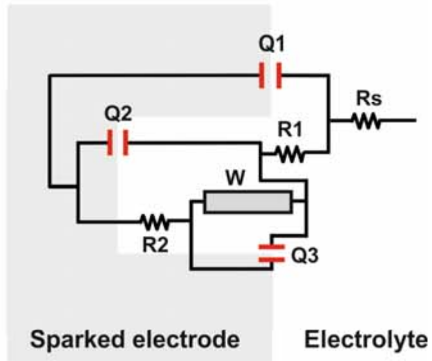


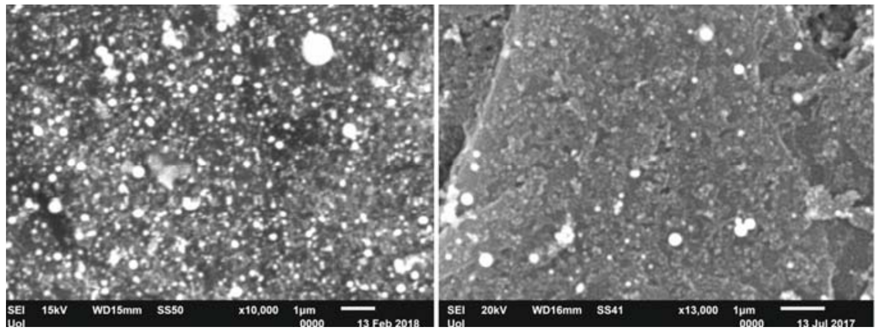
INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

Faradic Impedance : AuNPs "rich" and "poor" electrode surface/electrolyte interfaces









ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

Research Outputs & Prototypes: Detection of “date rape” drug flunitrazepam

Contents lists available at ScienceDirect

Biosensors and Bioelectronics

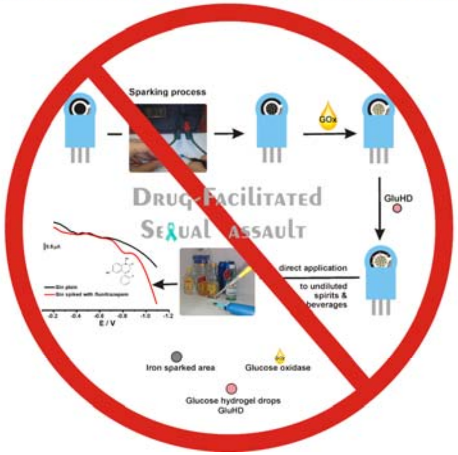
journal homepage: www.elsevier.com/locate/bios

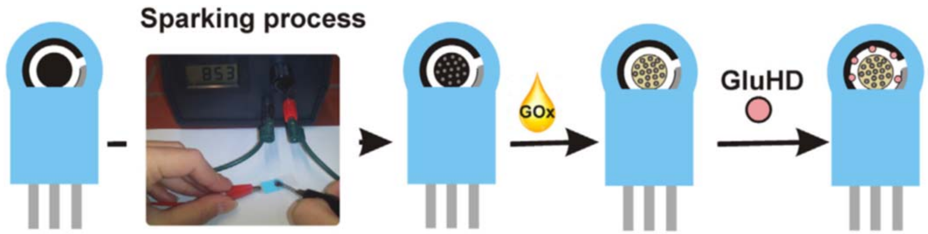
ELSEVIER

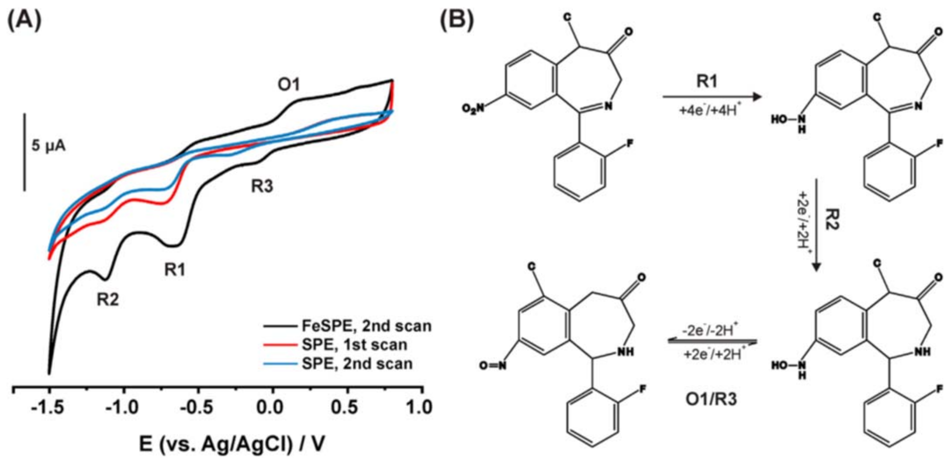
Biosensors and Bioelectronics 132 (2019) 136–142

Lab-on-a-screen-printed electrochemical cell for drop-volume voltammetric screening of flunitrazepam in untreated, undiluted alcoholic and soft drinks

Fotini Tseliou[a], Periklis Pappas[b], Konstantinos Spyrou[c], Jan Hrbac[d], Mamas I. Prodromidis[a,*]





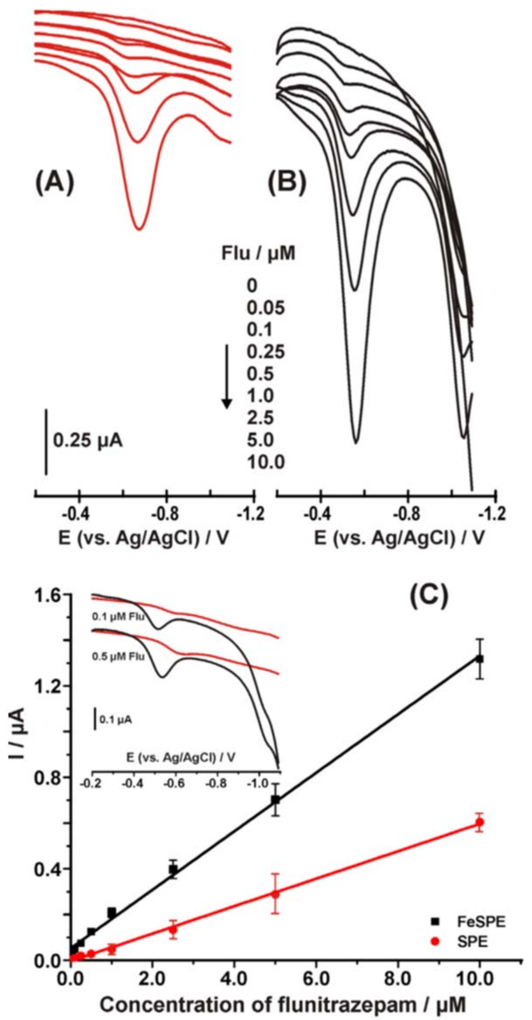


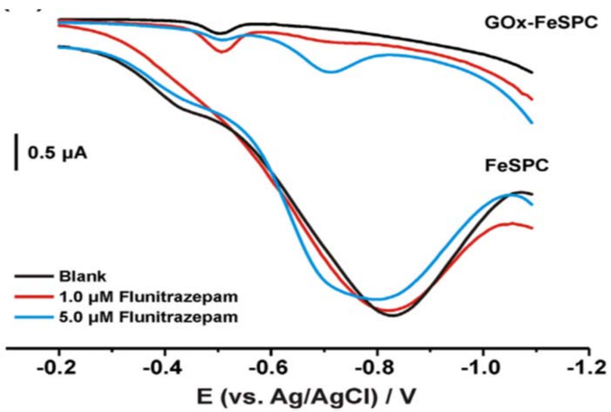
INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

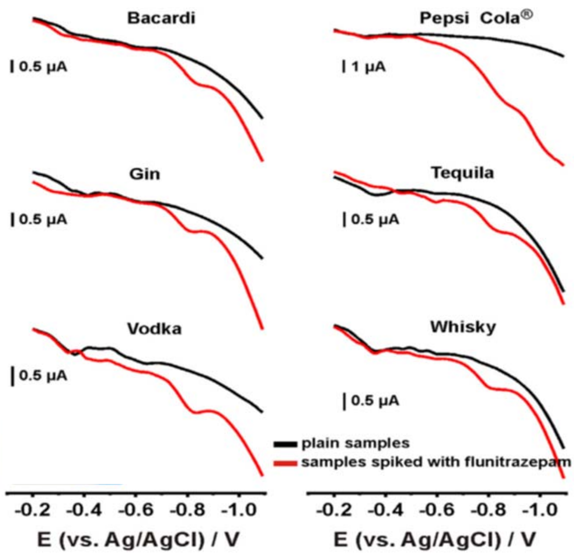
ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA

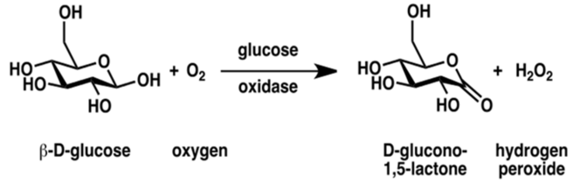
Electrochemical Sensors and Biosensors Group
http://lac-sensor.lab.uoi.gr

Direct drop-volume of flunitrazepam in undiluted, untreated spirits and soft drinks









INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

Research Outputs & Prototypes: Point-of-care medical diagnostic devices

Contents lists available at ScienceDirect

Sensors and Actuators B: Chemical

journal homepage: www.elsevier.com/locate/snb

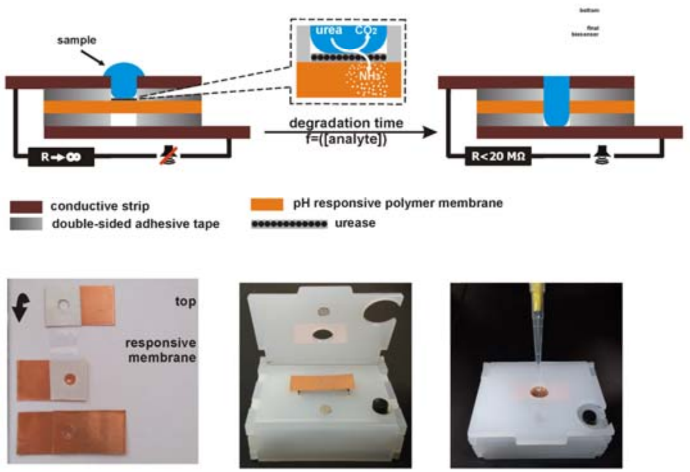
ELSEVIER

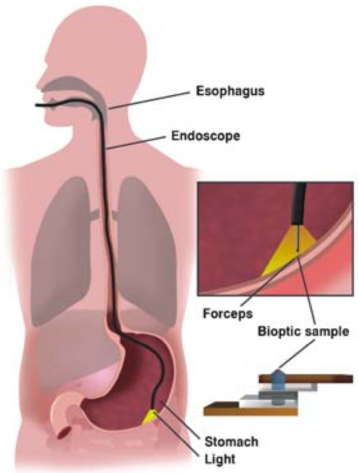
Sensors & Actuators: B. Chemical 304 (2020) 127356

A portable medical diagnostic device utilizing free-standing responsive polymer film-based biosensors and low-cost transducer for point-of-care applications

Eleni I. Tzianni[a], Jan Hrbac[b], Dimitrios K. Christodoulou[c], Mamas I. Prodromidis[a,*]

[a] Department of Chemistry, University of Ioannina, 45 110 Ioannina, Greece
[b] Department of Chemistry, Masaryk University, 625 00 Brno, Czech Republic
[c] Department of Gastroenterology, University Hospital of Ioannina, 45 110 Ioannina, Greece





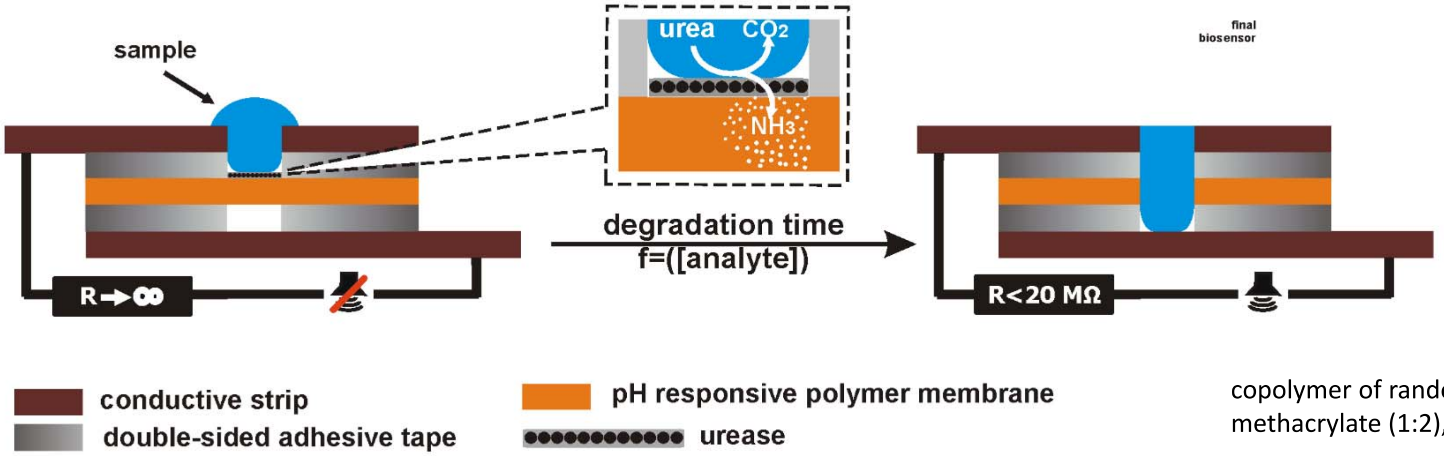
INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ
UNIVERSITY OF IOANNINA
Electrochemical Sensors and Biosensors Group
HTTP://LAC-SENSOR.LAB.UOI.GR

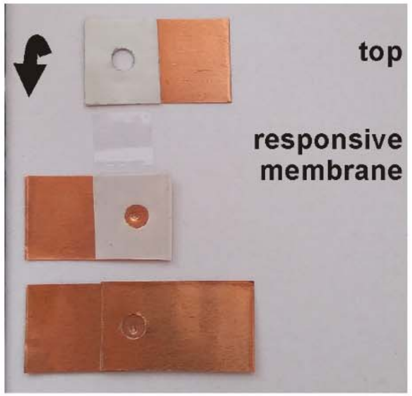
Research Outputs & Prototypes: Determination of urea in undiluted, untreated urine

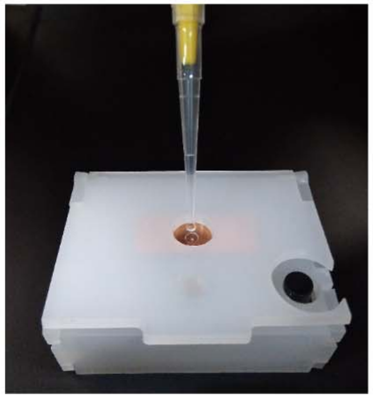
bottom

final biosensor



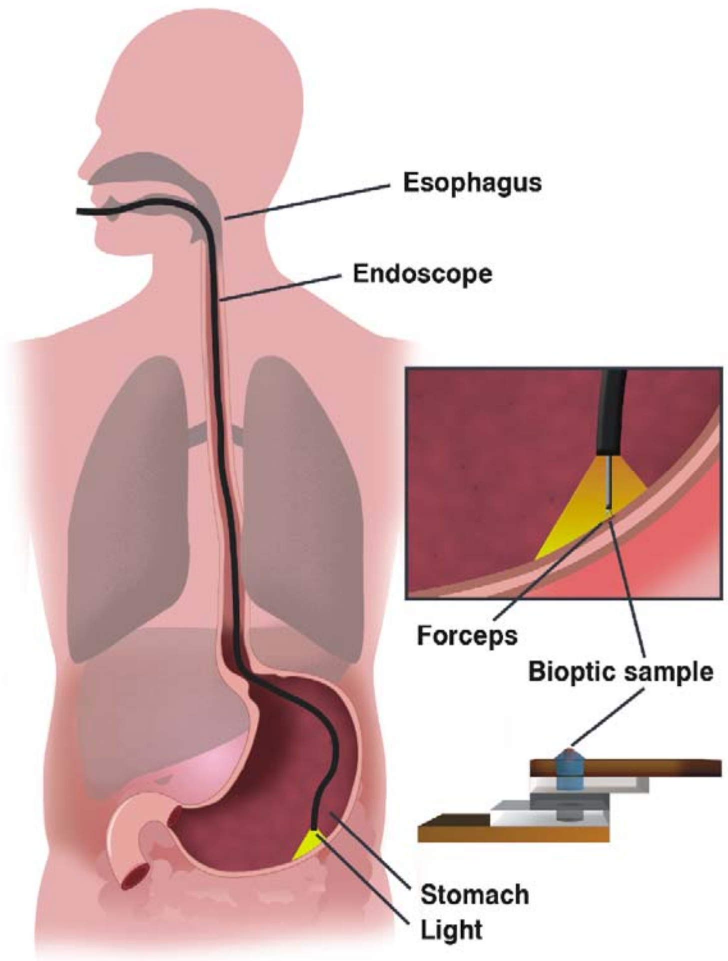
copolymer of randomly distributed methacrylic acid - methyl methacrylate (1:2), containing 0.3% SLS, Mw ca. 125 kDa





INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

Research Outputs & Prototypes: Near-patient detection of *H. Pylori* infection



H. Pylori infection results in synthesis of significant amount of urease by the microbium in gastric.

Sample	BioPoC biosensor	CLO® test
1	P	P
2	P	P
3	P	P/N
4	N	N
5	N	N
6	N	N
7	N	N
8	N	N
9	N	N
10	N	N
11	N	N
12	N	N
13	P	P
14	N	N
15	N	N
16	N	N
17	P	P
18	N	N
19	N	N
20	N	N

INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

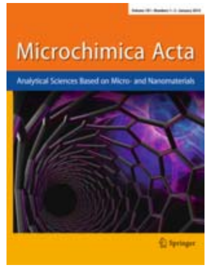
The Group and collaborators

Prof. Mamas Prodromidis, Editor-in-Chief Microchimica Acta (IF. 6.23)
Dr. Aggeliki Florou, Senior Researcher - Laboratory Teaching Staff

Mrs. Maria Trachioti, PhD candidate
Mrs. Eleni Tzianni, PhD candidate
Mr. Alexandros Lazanas, PhD candidate
Mr. Athanasios Kolovos, PhD candidate

Mr. Anastasios Papavasiliou, Master student
Mrs. Hera Sdoukou, Master student
Mr. Stamatios Argyroudis, Master student
Mrs. Maria Siampani, Master student

Prof. Jan Hrbac, Masaryk University, Brno, Czech Republic
Prof. Anastasios Economou, University of Athens, Greece
Prof. Ciara O' Sullivan, University Rovira I Virgili, Tarragona, Spain
Prof. Dimitrios Christodoulou, University Hospital of Ioannina, Greece
Prof. Apostolos Avgeropoulos, University of Ioannina, Greece
Lchem Ltd. Olomouc, Czech Republic
eTRIS electronic applications, Kilkis, Greece



SPRINGER NATURE

Springer

INSTITUTE OF MATERIALS SCIENCE AND COMPUTING

ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ

UNIVERSITY OF IOANNINA

ELECTROCHEMICAL SENSORS AND BIOSENSORS GROUP

HTTP://LAC-SENSOR.LAB.UOI.GR

INSTITUTE OF MATERIALS SCIENCE AND COMPUTING