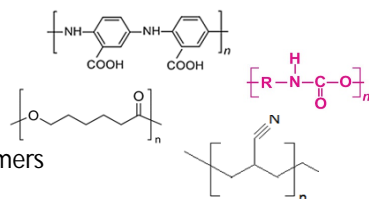


Biocompatible Polymeric Electrospun Nanofibers Functionalization by Proteins, Electrochemical, Spectroscopic Morphologic Characterizations

- poly(m-anthranilic acid) (PANA)
- polyurethane (PU)
- polycaprolactone (PCL)
- polyacrylonitrile (PAN) & copolymers

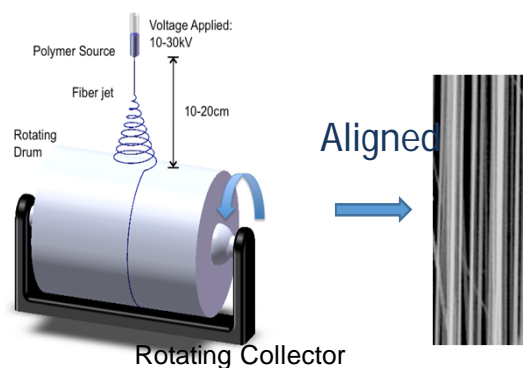


$$E(t) = E_0 \cos(\omega t)$$

$$Z = E(t) / I(t)$$

$$I(t) = I_0 \cos(\omega t - \Phi)$$

Φ : Bode phase



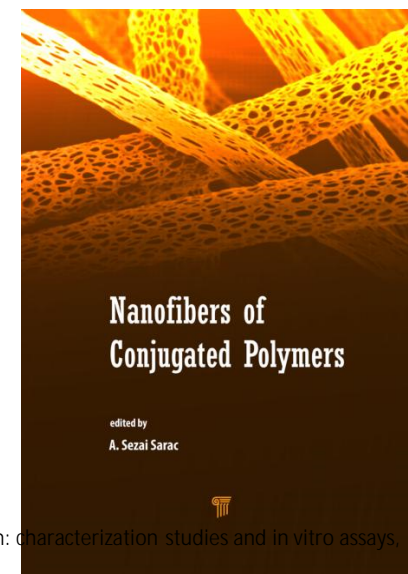
Prof.Dr.A.Sezai SARAC

Istanbul Technical University
Polymer Science & Technology
Nanoscience and Nanoengineering
Istanbul, Turkey



Research Activities

Conjugated polymeric Composite Nanofibers
Nanofibers of Polyanthranilic Acid Composites
Protein & Enzyme Immobilization
Electrochemical Impedance Spectroscopy (EIS)
Drug Delivery & Biosensors



Gençtürk A., Sarac A.S., Determination of Donepezil HCl Release from Electrospun Fiber by Electrochemical Impedance Spectroscopy, *Int. J. Electrochem. Sci.*, 11, 111 (2016)

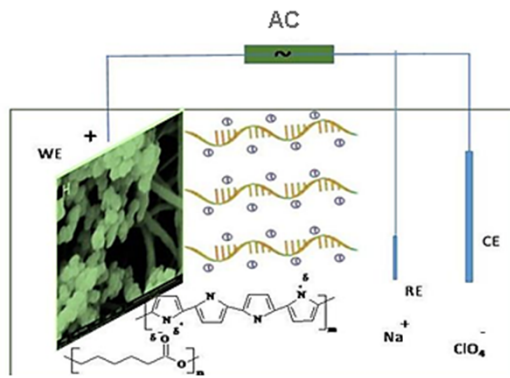
Gençtürk A., Kahraman E., Güngör S., Özhan G., Özsoy Y., Sarac A.S., Polyurethane/hydroxypropyl cellulose electrospun nanofiber mats as potential transdermal drug delivery system: characterization studies and in vitro assays, *Artificial Cells, Nanomed, and Biotechnology* 45, 655-664 (2017)

A.S.SARAC, A. GENÇTÜRK, A. D. ÖZEL, "New Drug Delivery System" Appl. date 06.06.2013, **European Patent No: EP2810645 A1** /10 Dec 2014

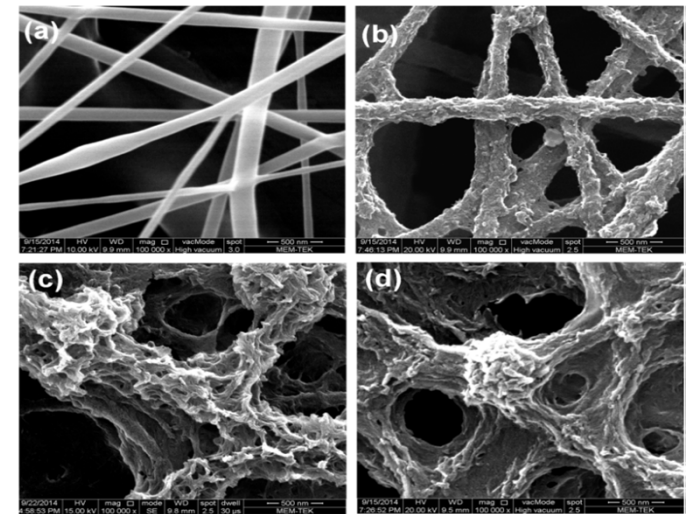
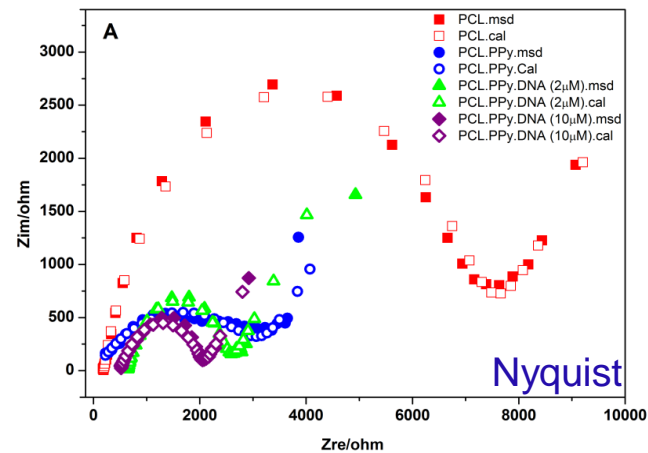
Biosensor applications

- DNA immobilized nanofibers as electrochemical DNA biosensor

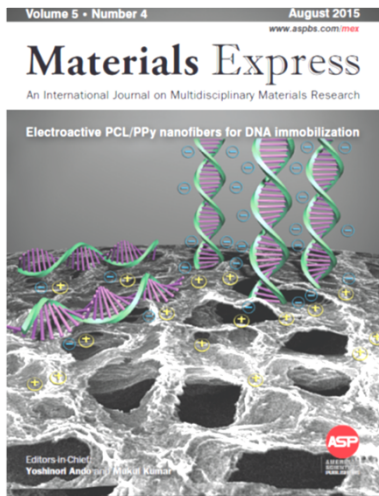
Poly(caprolactone)- PCL /Polypyrrole-PPy / ssDNA Nanofibers



Electrochemical impedance spectroscopy (ECM)



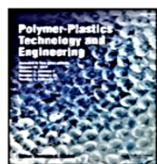
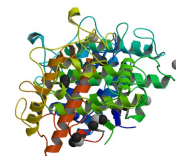
PCL (a), PCL/PPy (b) and 2 μ M (c) and 10 μ M (d) ssDNA immobilized PCL/PPy/ssDNA



- Guler, Z., Erkoc, P., & Sarac, A. S. (2015) *Materials Express*, 5(4), 269-279
- Giray D.,Balkan T.,Dietzel B., Sarac A.S., *Eur. Polymer Journal* (2013) 49,2645

Biofunctionalized nanofibers

- Tyrosinase(Tyr) immobilized nanofibers as dopamine sensor



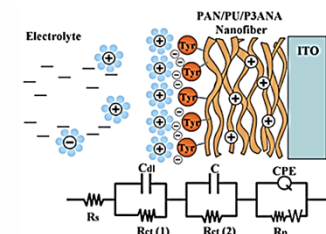
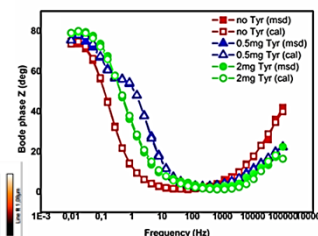
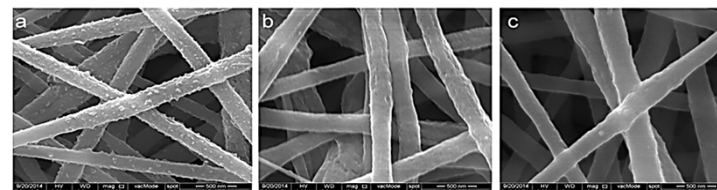
Polymer-Plastics Technology and Engineering

Taylor & Francis
Taylor & Francis Group

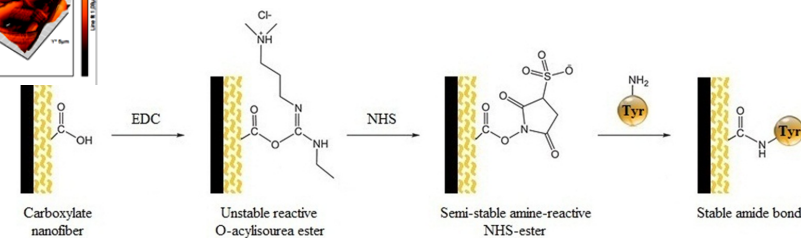
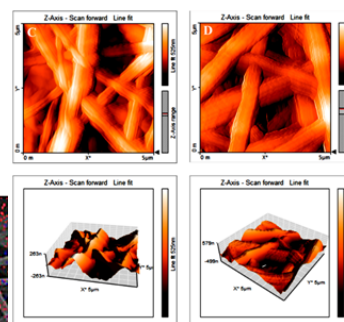
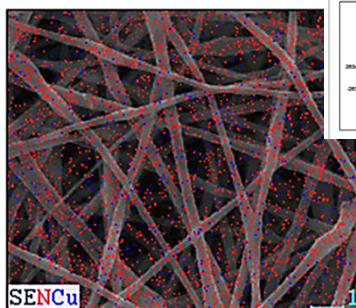
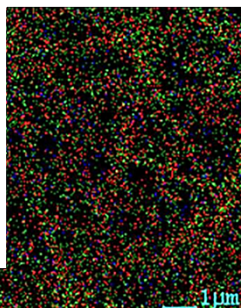
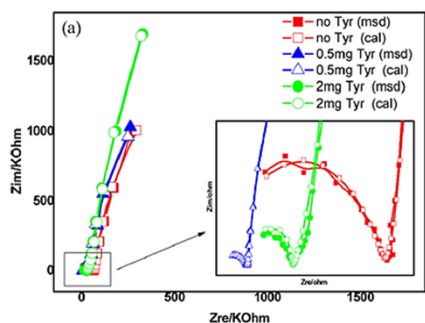
ISSN: 0360-2559 (Print) 1525-6111 (Online) Journal homepage: <http://www.tandfonline.com/loi/lpte20>

Covalent Immobilization of Tyrosinase on Electrospun Polyacrylonitrile/Polyurethane/ Poly(m-anthranilic acid) Nanofibers: An Electrochemical Impedance Study

Ugur Dagli, Zeliha Guler & A. Sezai Sarac

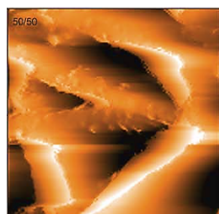


Nitrogen (red) and copper (Blue) atoms on the surface of tyrosinase immobilized PAN/PU/PANA nanofibers



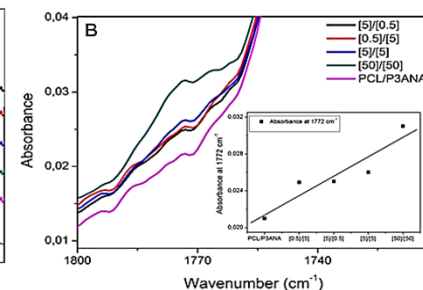
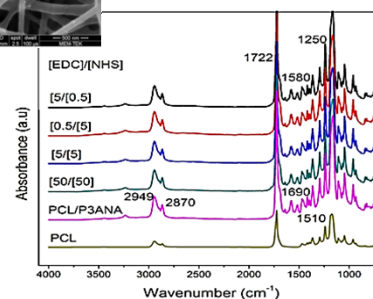
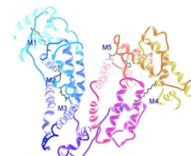
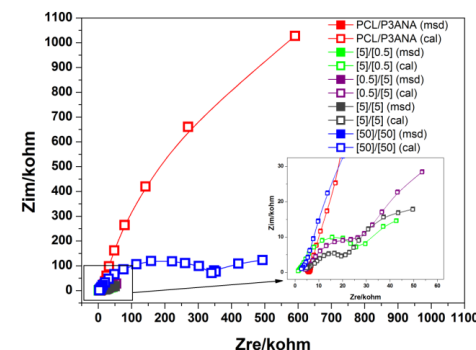
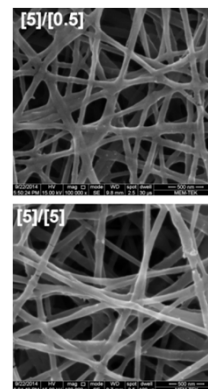
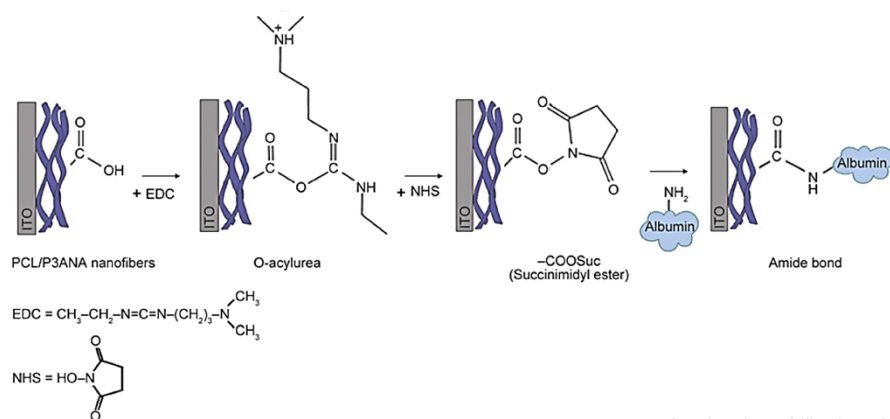
Poly(ϵ -caprolactone)/ poly(anthranilic acid) /Albumin

EXPRESS Polymer Letters Vol.10, No.2 (2016) 96–110
Available online at www.expresspolymlett.com
DOI: 10.3144/expresspolymlett.2016.11



Electrochemical impedance and spectroscopy study of the EDC/NHS activation of the carboxyl groups on poly(ϵ -caprolactone)/poly(m-anthranilic acid) nanofibers

Z. Guler¹, A. S. Sarac^{1,2,3*}

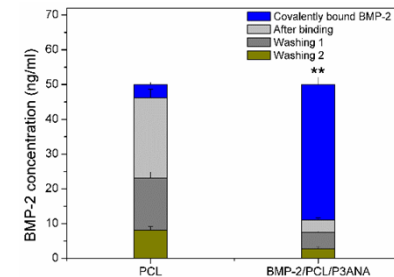
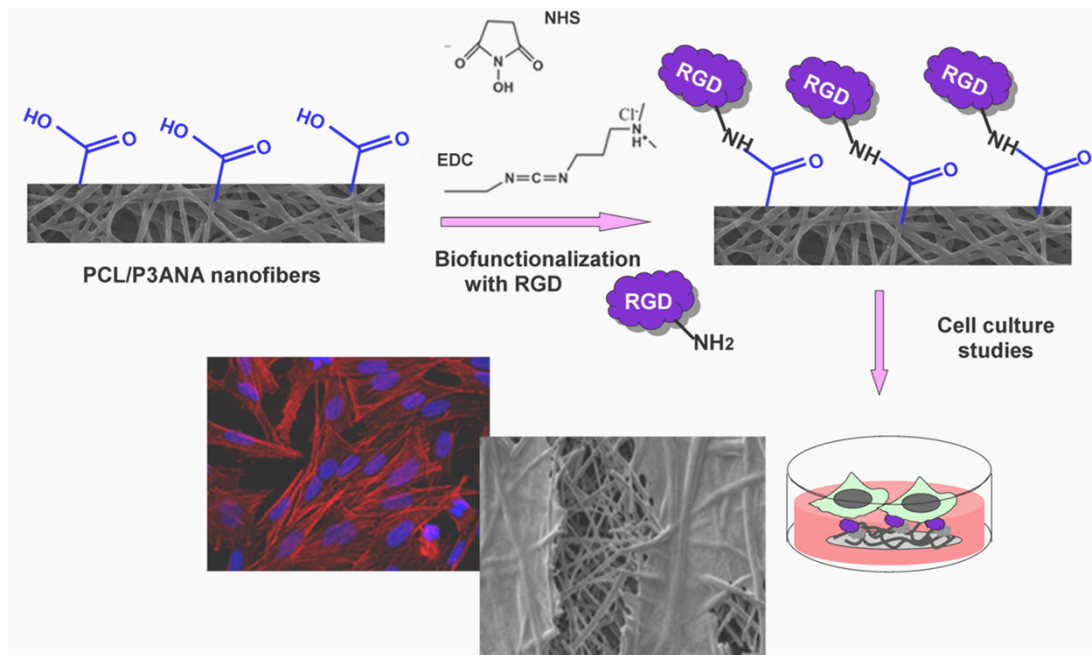


Electrospinning conditions: 15 kV / 15 cm, Feed rate 1ml/h ,PCL/P3ANA solution in 1/1 v/v THF/DMF

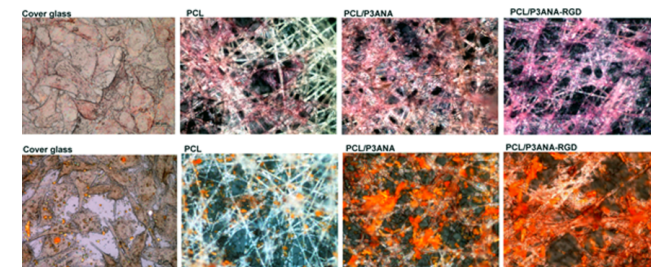
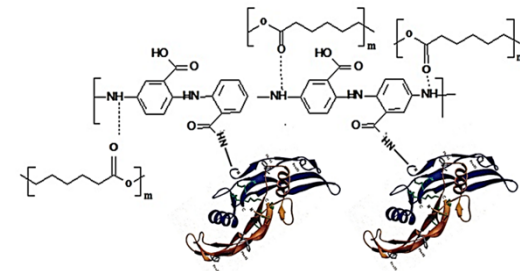
Covalent immobilization of biomolecules onto a -COOH group containing surface consists in preparing a succinimidyl ester (-COOSuc)-terminated surface and reacting it with an amino (-NH₂) group on the biomolecule.

The -COOSuc surface can be obtained by a reaction referred as surface "activation" which is conducted by reacting a surface bearing carboxyl end groups with **N-hydroxysuccinimide (NHS)**, in the presence of carbodiimide such as **1-ethyl-3-(dimethyl-aminopropyl) carbodiimide hydrochloride (EDC)**.

RGD functionalized poly(ϵ -caprolactone)/poly(m-anthranilic acid) electrospun nanofibers as scaffolds for bone tissue eng.



BMP-2/PCL/P3ANA



Guler, Z., Silva, J. C., Sarac, A. S., Int.J.Polym. Mater. Polym.Biomater. ,66 (3)139-148 (2017)

Guler, Z ,Silva, JC ,Sarac, AS, Journal of Biomaterials Appl. 31 (5)743-754 (2016)



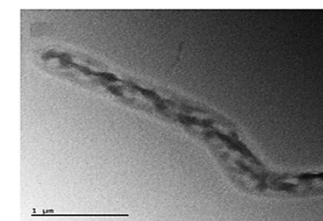
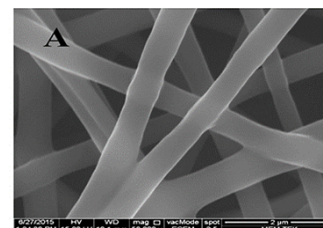
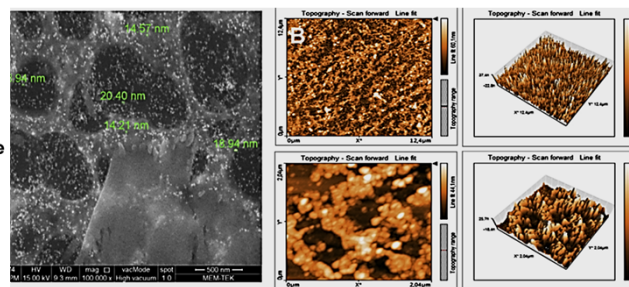
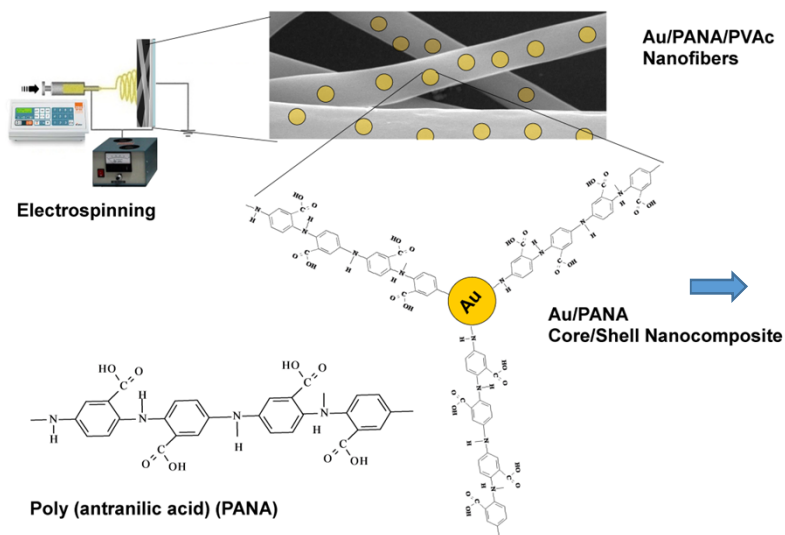
(Au/PANA/PVAc) nanofibers as a novel composite matrix for albumin and streptavidin immobilization

Rana Golshaei^a, Zeliha Guler^b, Sezai A. Sarac^{b,c,*}

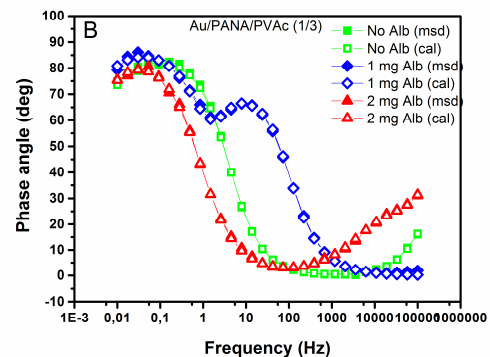
^a University of Kashan, Institute of Nano Science and Nano Technology, Kashan, P.O. Box 87317-51167, Islamic Republic of Iran

^b Istanbul Technical University, Nanoscience and Nanotechnology, Maslak, Istanbul 34469, Turkey

^c Istanbul Technical University, Department of Chemistry and Polymer Science and Technology, Maslak, Istanbul 34469, Turkey



EIS



•Satıcı M.T., Sarac A.S., Int.J.Polym. Mater. & Polym. Biomater. (2015) 597

•Engin S.F.Z., Unsal C., Kayali E.S., Sarac A.S., React. & Funct. Polym. 100, 1-11(2016)

