e-BOOK OF ABSTRACTS

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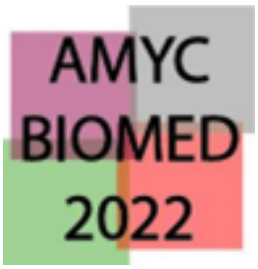
AMYC-BIOMED 2022

3th Autumn Meeting for Young Chemists in Biomedical Sciences



17-19 October 2022 – Naples

Organizing Institution

Department of Excellence of Pharmacy (2018-2022), University of Naples Federico II

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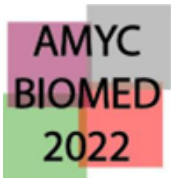
We would like to thank all the speakers and participants for their contributions!



PROGRAMME

Chairperson: Claudia Conte, University of Naples Federico II

Dr. Thomas Moore, IIT Genova
Nanomedicines: From formulation development to crossing biological barriers

16:50 **SESSION 5**

Chairperson: Marco Mendolicchio, Scuola Superiore Meridionale

ORAL COMMUNICATIONS (10+2min Q/A) – ***SKIN-RELATED***

Giuseppe Arrabito, University of Palermo Emilio Segrè
Self-cleaning ZnO/ITO/PET Bending Sensors

Maddalena Sguizzato, University of Ferrara
Transdermal delivery of antioxidant-loaded ethosomes: formulation, application and activity on the skin

17:15 **SESSION 6**

Chairperson: Marco Mendolicchio, Scuola Superiore Meridionale

ORAL SLIDE&TALK (5min) – ***EYES-RELATED***

Teresa Silvestri, Italian Institute of Technology
Formulation and characterization of Poly(lactic-co-glycolic acid) based microparticles for intravitreal injection

Rosa Sparaco, University of Naples Federico II
Synthesis of new molecular hybrids of antiglaucoma drugs and H2S donors

Elide Zingale, University of Catania
Optimization of a lipid nanoplatform by Response Surface Methodology to improve the ocular delivery of diosmin: characterization and in-vitro antinflammatory assessment

17:30 **CLOSING AND SOCIAL ACTIVITIES**

Self-cleaning ZnO/ITO/PET Bending Sensors

Giuseppe Arrabito,[1§] Antonio Delisi,[1§] Giuseppe Prestopino,[2] Federica Arcidiacono,[3] Delia Francesca Chillura Martino,[3,4] and Bruno Pignataro[1,4]

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Keywords: Bending sensor, self-cleaning, wearable sensor, piezophotocatalysis

The design of multifunctional materials is of pivotal importance for developing wearable biosensors. In particular, the advancement in self-cleaning materials suitable for bending sensors, i.e. devices able to track human body movements for healthcare monitoring [1], has raised much interest in recent pandemic times. Such technology can be facilitated by leveraging piezo-photocatalytic cleaning effects under visible light [2]. Herein, we show a new class of ZnO-based nanosheets (NSs) synthesized in aqueous solution (85 °C, 24 hours) onto *seeded* or *seedless* ITO/PET surfaces that couple sensing to photocatalysis. UV-vis and FT-IR spectroscopies show the typical absorption peaks of ZnO. A nano-squared pattern is observed on ITO, likely resulting from mixed SnO_2:ZnO nanocubic photocatalytic composites [3]. In the absence of the MnOOH seed layer film (*seedless ZnO*), NSs show flower-like morphology showing a significantly lower density (about twenty times) with respect to the *seeded* version. The electrical response of the sensors is extracted at a 1 V bias as a function of bending in the interval between 0° and 90°. The sensing response is dependent on the density of the ZnO NSs. Upon bending from 0° to 90°, the *seedless ZnO* sensors show 50-70 µA decrease, whereas the *seeded ZnO* sensors show a 180-200 µA decrease, which is about two times higher than the currently reported ZnO based bending sensors [4]. As a control, the *bare ITO* supports only show few µA decrease upon bending. The photocatalytic activity of the sensors is analysed in aqueous solution (methylene blue, 25 µM) at 1 Sun illumination. The seeded ZnO sensors show the best photocatalytic performances with respect to seedless ZnO and bare ITO. Upon bending the sensor inside the cuvette, the photocatalytic activities of bare ITO and seeded ZnO are improved (about 30%), whereas seedless ZnO is unaffected. After washing with deionized water, the sensors retain most of their photocatalytic activity.

References

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