

FIT-4-NMP Networking and Brokerage Event

organized by FIT-4-NMP H2020 project at the 45th International Semiconductor Conference - CAS 2022

3D Graphene and 3D Graphene Hybrids

Short description of topic (scientific description)

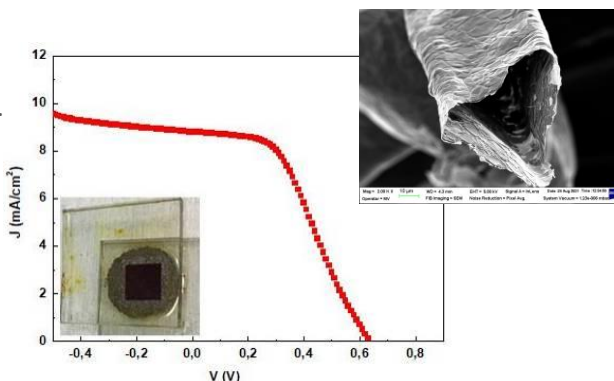
"Dye Sensitized Solar Cells With Integrated 3D Graphene Structures - DSSC-WIDGET", 129PED/2017, 2017-2018, Programme 2 - Increase Competitiveness of the Romanian Economy through Research, Development and Innovation.

Partners: INCDIE ICPE-CA BUCHAREST (coordinator), IMT BUCHAREST. **The general objective of the project** was to evaluate the functionality of the 3D graphene structures in optoelectronic devices, specifically in photovoltaic cells (DSSC).

ICPE-CA role: Synthesis of 3D graphene structure on the metal catalyst; Structural and morphological characterization of the 3D graphene structure on the metal catalyst; Removing the metal catalyst from the 3D graphene structure; Functionalization of the 3D graphene structure.

Project results: **Experimental model of DSSC type photovoltaic cell with 3D graphene counter electrode attached to FTO with conductive organic polymer (PEDOT: PSS) with an efficiency of 2.5%.**

Current density variation according to voltage and photographic image of DSSC photovoltaic cell with 3D graphene counter electrode



"CarBon quANtum Dots/graphene hybrids with broad photoresponsivity – BANDPASS", Horizon 2020 ATTRACT Third Party Project Agreement, 2019-2020.

Partners: IMT Bucharest (coordinator), Babes-Bolyai University - Faculty of Chemistry and Chemical Engineering, INCDTIM, INCDIE ICPE-CA.

The aims of the project were: Development of flexible graphene-based photodetectors (PD) with broad responsivity by exploring several strategies to synthesize graphene-based materials: (i) colloidal carbon quantum dots (CQD) with broad absorption; (ii) reduced graphene oxide with various degree of reduction (RGO) as well as their chemical doping (N-RGO); (iii) foam-like 3D graphene (GF) structures by thermal CVD. 3D graphene foam with a large surface area and excellent transport properties was chemically synthesized from methane at ICPE-CA.

Short description of Organization/Laboratory/Department:

In August 2004 based on the decision HG no. 1282 of the Romanian Government published on Official Monitor no. 775/24.08.2004 has been founded the National R&D Institute for Electrical Engineering ICPE-CA Bucharest. This institute, with a high scientific and professional reputation, carries out: research, development, small-scale manufacturing and service activities especially in the field of electrical engineering technologies, materials, and other related fields of activity.

The Carbon Materials Laboratory has over the 40 years of research experience in carbon materials for applications in the electrical engineering industry. The vision is to 'tailor' new carbon materials and composites, based on a sound scientific footing and then extend the range of materials and applications by using the developments in nano-structured materials.

Organisation: National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest, Romania

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Reference of Call/ topic of interest.

- Research & Innovation Actions, Coordination & Support Actions / Advanced Materials Domain (Functional Materials, Graphene, Materials for Energy)

Potential contribution/ main ideas

- Materials development (3D graphene or its hybrids for using as electrode in different energy devices)
- Materials characterization

