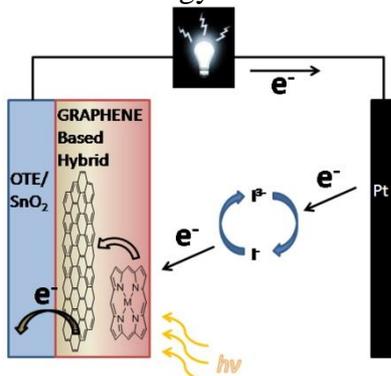


## Functionalization of graphene with multichromophoric arrays of photoactive units for energy conversion (FUNGRAPH-ARISTEIA II)

The strategic objective of FUNGRAPH is the fundamental understanding of graphene-based hybrid materials with photoactive molecular units that could serve as models for new solar-energy converters. This proposal deals with energy conversion schemes in graphene-based hybrid materials with multichromophoric arrays of photoactive molecular systems. Careful design and selection of chromophores to include multiple photon absorbers in a single system could be an intriguing and efficient approach and will be motivated. In FUNGRAPH, we intend to combine (a) silicon-porphyrin (SiP) with e.g. boron dipyrin or/and boron azadipyrin, (b) terthiophene with e.g. triphenylamine or/and trithienobenzene, and (c) derivatized perylene diimides (PDIs) with e.g. imidazole or piperazine, or bipyridine, and conjugate them with exfoliated graphene sheets to construct model systems for photoelectrochemical cell devices. Herein, two parallel principles will be applied: (a) covalent grafting of the multichromophoric arrays onto the framework of exfoliated graphene sheets, and (b) noncovalent  $\pi$ - $\pi$  stacking of the SiP-based molecular system onto the planar graphene – similarly, PDI-based derivatives may be also used for non-covalent  $\pi$ - $\pi$  stacking interactions with graphene. It is expected that the multichromophoric graphene-based arrays obtained in this way will have improved performance, more efficient light harvesting properties, afford long-lived charge-separated species and show intense absorption in the red and NIR regions. The scientific results of FUNGRAPH are at the cutting edge of graphene area, involving new knowledge and innovation. They can be utilized for economic and regional growth and will contribute towards National and EU goals for knowledge-based activities as means to economic and social growth. Finally, FUNGRAPH will aid Greece to touch the level of EU science and to be involved into frontier challenges of modern science and technology.



FUNGRAPH is implemented in the framework of the Operational Program "Education and Life-long Learning" (Action "ARISTEIA II") and it is co-funded by the European Union (European Social Fund) and national funds.



European Union  
European Social Fund



MINISTRY OF EDUCATION & RELIGIOUS AFFAIRS, CULTURE & SPORTS  
MANAGING AUTHORITY

Co-financed by Greece and the European Union



### Contact:

Dr. Nikos Tagmatarchis  
Theoretical and Physical Chemistry Institute,  
National Hellenic Research Foundation,  
48 VassileosConstantinou Ave.,  
Athens 11635, Greece

Tel.: +30 210 7273835

FAX: +30 210 7273794

E-mail: [tagmatar@eie.gr](mailto:tagmatar@eie.gr)