FORTH - ARCHERS (NIARCHOS) Conference
ARCHERS FINAL (VIRTUAL) CONFERENCE
DECEMBER 6-8, 2021

Laser-assisted graphene growth for energy storage applications

Nikolaos Samartzis

ABSTRACT

The need for transcending from fossil fuels to electrically powered engines necessitates the improvement of energy storage devices, such as batteries or supercapacitors, in terms of energy/power density and cyclability. Carbon nanostructures are well-adapted into the field of energy storage devices. The synthesis of graphene-based structures with 3D porous morphology, high specific surface area and conductivity, is currently pursued towards energy storage applications. The most common routes to produce graphene porous structures involve either chemical or thermal methods, which use harmful chemicals and energy intensive processes. We will present a novel approach for the laser-assisted production of graphene which is safe, cost-effective, scalable and environment-friendly, as it operates at strictly ambient conditions employing low-cost precursors, such as biomasses described products and polymers. The electrochemical properties of the laser-grown graphene-based structures have been investigated and the performance and stability of electric-double layer capacitors has been evaluated.