

PEGASUS machine is now operational



Researchers Dr. Ana Dias and Dr. Edgar Felizardo demonstrate the PEGASUS machine.

A versatile plasma-based machine producing high-quality graphene and derivatives with high level of customization (e.g., graphene, N-graphene and hybrid graphene-metal-based nanostructures) is now operational at PEL - IPFN.

This cost-effective and disruptive technology for *synthesis-by-design* of advanced 2D materials allows single-step continuous large-scale fabrication at ambient conditions.

High levels of selectivity regarding the ratio of single atomic layers (~50%) and N-doping levels were achieved at high-yield (40 mg/min), with low oxygen content, and good repeatability, using inexpensive starting materials.

The high quality of the produced sheets is attested by the results of comprehensive physicochemical analyzes performed (Graphene: C/O > 50, sp² carbons ~ 70%; N-Graphene: C/O > 40; sp² > 60%).

Nanocomposite materials are fabricated using graphene as a highly conductive matrix where metal oxides/sulfides nanoparticles (~10-30 nm) are incorporated.

This novel technology enables the tailoring of graphene-based nanostructures with unique properties, unparalleled materials for next-generation electronics, energy conversion and storage devices, chemical and biological sensing applications (e.g., batteries, supercapacitors, metamaterial unit cells, solar and fuel cells, gas-sensors, bio-sensors, etc.).