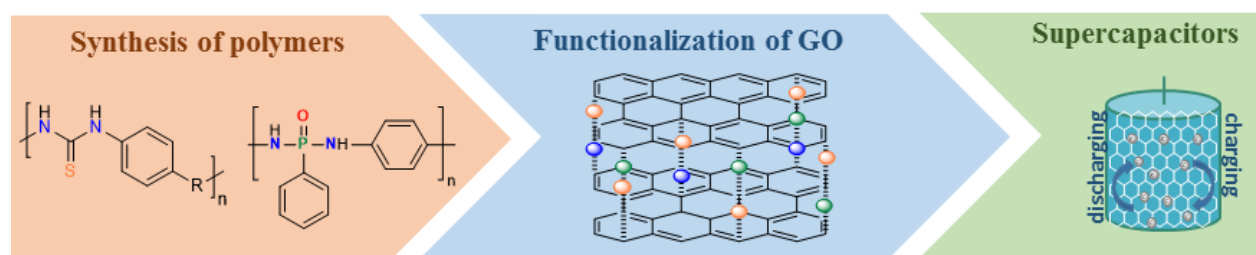


Research project objectives

The project titled "Three-dimensional heteroatoms enriched graphene based structures for pseudocapacitors" will exploit functionalization of graphene-based materials with polymers containing heteroatoms such as sulfur, nitrogen and phosphorous to prepare energy storage materials with enhanced electrochemical performance. The realization of the project can be divided for following activities:

- Synthesis and characterization of phosphorous, nitrogen and sulphur based polymers.
- Functionalization of graphene oxide (GO) with obtained polymers and its complex physico-chemical characterization.
- Fabrication of electrodes and measurements towards electrochemical performance of obtained materials and its application in energy storage materials.



Basic research

Graphene is one of the most widely explored 2D material during the last decade and exhibit unique electrical, thermal and morphological properties. Moreover, graphene is more ecological friendly than other forms of energy storage. To enhance the electrochemical performance of traditional electrical double layer electrodes might be enriched with additional pseudocapacitance by introduction of heteroatoms such as sulfur, nitrogen, phosphorous or boron. Therefore introduction of specific molecules (*e.g* polymers) can significantly increase operating voltage of supercapacitors as well as influences stability of graphene based material which is advantageous in development of novel energy storage materials.

Research project impact

The project will allow to gain broad knowledge of electrochemical performance of novel graphene based materials and investigate potential use of new electrodes in supercapacitors. It is also important to note that the proposed research project has an interdisciplinary character, as it combines various scientific disciplines ranging from organic synthesis, through material chemistry to electrochemistry. Moreover, project will be continuation of international collaboration between Adam Mickiewicz University (AMU) in Poznań and prestigious Institut de Science et d'Ingénierie Supramoléculaires (ISIS), University of Strasbourg (France).