

Reg. No: 2015/18/E/ST8/00291; Principal Investigator: dr hab. Chen Xuecheng

Proposed research grant is undertaken to reveal the fundamental knowledge in the field of three dimensional graphene/carbon nanotubes nanocomposite in electrochemical properties. The three dimensional graphene/carbon nanotubes will be synthesized from waste polymer/MgO-metal oxide nanocomposite and polymer will be served as carbon sources for the growth of carbon nanotubes and graphene, MgO flakes will be served as template for the synthesis of graphene. Furthermore, three kinds of metal oxide catalyst for the growth of carbon nanotubes supported on MgO flakes will be investigated. The obtained data will allow to orientate the future applied research. Therefore, the presented science belongs to so called "oriented fundamental science". The proposed research will be conducted to gain the broad base of information to solve the current problems in lithium ion battery and in supercapacitors of new generation. Examples of fundamental research realized within the grant:

1. Revealing of the method for efficient functionalization of MgO with metal oxide nanoparticles;
2. Study on influence of metal oxide type on the morphologies of produced carbon nanotubes in the obtained graphene/carbon nanotubes nanocomposite;
3. Investigation of electrochemical properties of obtained graphene/carbon nanotubes nanocomposite;
4. Discovery of the most efficient way for preparation of three dimensional structured graphene/carbon nanotubes nanocomposite from waste polymer,
5. To find a way to recycle the waste polymer into highly valuable products.