1. Objectives of the project

Project titled: „Synthesis of 3D graphene based materials using metathesis reaction'' aims to realize two main objectives, **synthesis of graphene-based 3D covalent porous architectures (G3DAs)** by chemical functionalization of graphene oxide (GO) as well as **the use of this attractive material for applications, including gas and chemical sensors and supercapacitors.**

2. Research to be carried out

Graphene and its derivatives play a key role in modern science and technology. Through functionalization it is possible to receive G3DAs materials which are expected to exhibit different properties compared with the pristine graphene/GO i.e. large surface area, porous features, unique mechanical properties. Synthesis of G3DAs will be attained by making use of functional groups of the GO surface, i.e. hydroxyl, carboxyl, and epoxy units (Fig. 1).

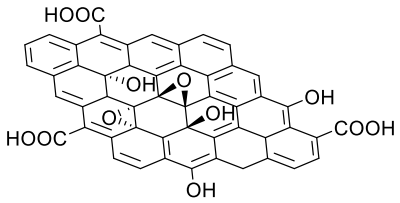

Fig. 1 Schematic representation of GO flake

The G3DAs will be fabricated by exposing GO to amine precursors with unsaturated bonds, which allows to further modification using widely applied organometallic reactions, in particular, olefin metathesis reaction, which is one of the most powerful strategy in the formation of C=C bonds in organometallic chemistry (Fig. 2). The obtained structures will be characterized by different techniques: spectroscopic and microscopic.

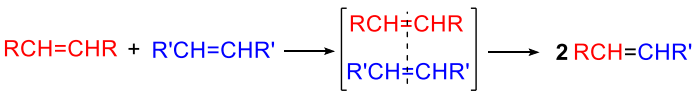

Fig. 2 Metathesis reaction

3. Reasons for choosing the research topic

The metathesis reactions of organic compounds have been the leading research subject in the group of Department of Organometallic Chemistry AMU for many years. The current research of group of Professor Paolo Samorì is focused on the architecture *vs.* function relationship in supramolecular and graphene based materials for applications in (opto)electronics and materials science. Through the international cooperation between both of groups it will be possible to obtain wide range of important information, which holds a potential in the field of nanotechnology. The implementation of proposed research methodologies will contribute to the knowledge of graphene community and will allow synthesis of a wide range of novel, innovative materials, which can be used in supercapacitors, gas and chemical sensors.