Oligomeric azagraphenoids. Synthesis and properties

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Carbon is one of the most important chemical elements, which is found to occur in Nature in two surprisingly different forms: the black coal-like graphite and the brilliant, precious diamond. At the end of the 20th century, fullerenes were discovered, a new form of carbon consisting of ball-like molecules (*Figure 1*). The most recent discovery in this area is graphene, an infinite, honeycomb-like sheet of carbon rings. It has many unique properties which make it attractive to scientists and science enthusiasts alike.

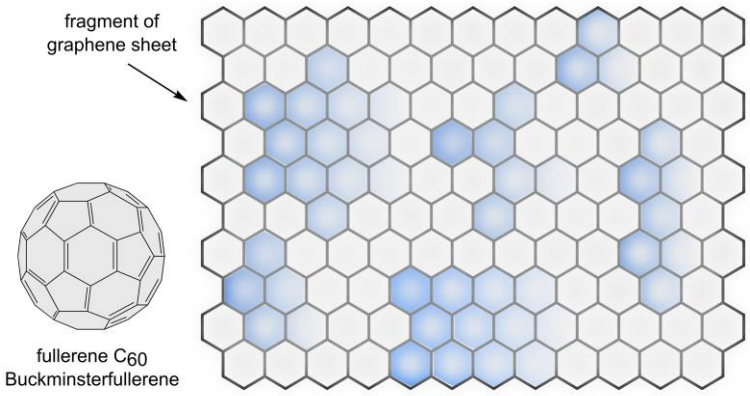

Figure 1. **Structures of allotropic forms of carbon: fullerene C_{60} and graphene fragment. On the surface of graphene examples of nanographenes are shadowed in blue.**

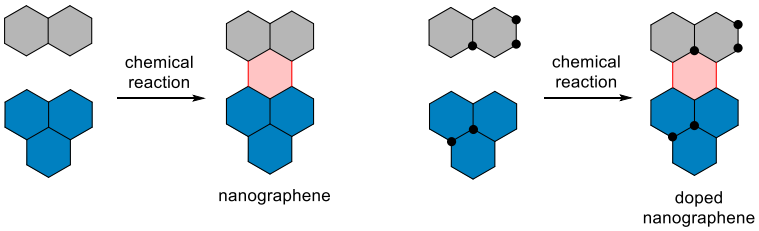

Figure 2. **Schematic presentation of nanographenenoids syntheses from smaller moleules and doping of nanographene.**

The mechanical methods of graphene production cause defects in its structure. Therefore, chemists are still looking for alternative ways to obtain graphene. Synthesis of graphene fragments (known as nanographenes) from small molecules is one possible and very attractive approach (*Figure 2*). Organic chemists can take one step forward and introduce other types of atoms (such as nitrogen) into nanographene molecules. Just like the flavor of a cake can be improved by adding some fruits, the introduction of nitrogen atoms into nanographenes (N-doping) can have a favorable effect on their properties.

The aim of this project is to arrange N-doped nanographene units into longer arrays, called oligomers. We expect to make these units interact with each other, because such interactions can be useful in molecular electronic devices. We hope to not only make new molecules with intriguing properties but also to discover new methods of chemical synthesis.