One of the most important tasks in modern chemistry is the development of new chemical compounds that can exhibit unusual, and if possible useful, interactions with their surroundings. In the enormous diversity of substances created daily worldwide, the majority of such “intelligent” molecules are the carbon-based organic compounds. These include not only the building blocks of all the living organisms (peptides, sugars, enzymes, and other), but also substances that create our civilization: novel, technologically relevant materials. Among the latter, graphene gained much interest in recent years. From the chemical point of view, it can be seen as a monolayer of fused hexagonal rings, built from carbon atoms. Its potential use in future material chemistry has been acknowledged with a Nobel prize in physics awarded to its creators in 2010. Graphene-like structures made in the nanoscale (1 nm = 10^{-9} m), known as nanographenes, can be seen as “cut-outs” made from a graphene sheet and often further modified. Their structural diversity is currently being expanded from planar molecules, through bowl-shaped, and into warped geometries. Among the great variety of systems with different numbers of fused rings and fusion patterns, molecules with uniquely large rings, known as coronoids, are of particular interest (Fig. 1). The synthesis and properties of new, extended coronoid hydrocarbons is the subject of the proposed project. The first step is the creation of “building blocks” that could be combined into giant coronoid molecules by specially devised chemical reactions. These compounds will be subjected to diverse experiments, the goal of which will be to confirm their structure and explore their behavior in the solid state and in solution. Our previous work led to the synthesis of two smaller members of the coronoid family, called chrysaorenes, and their nitrogen-containing analogue, chrysaorole. The proposed research on coronoids, which has a fundamental character, will expand our knowledge of the chemistry of nanographenes. It is also hoped to contribute to the future development of organic materials, especially for applications in organic electronics.

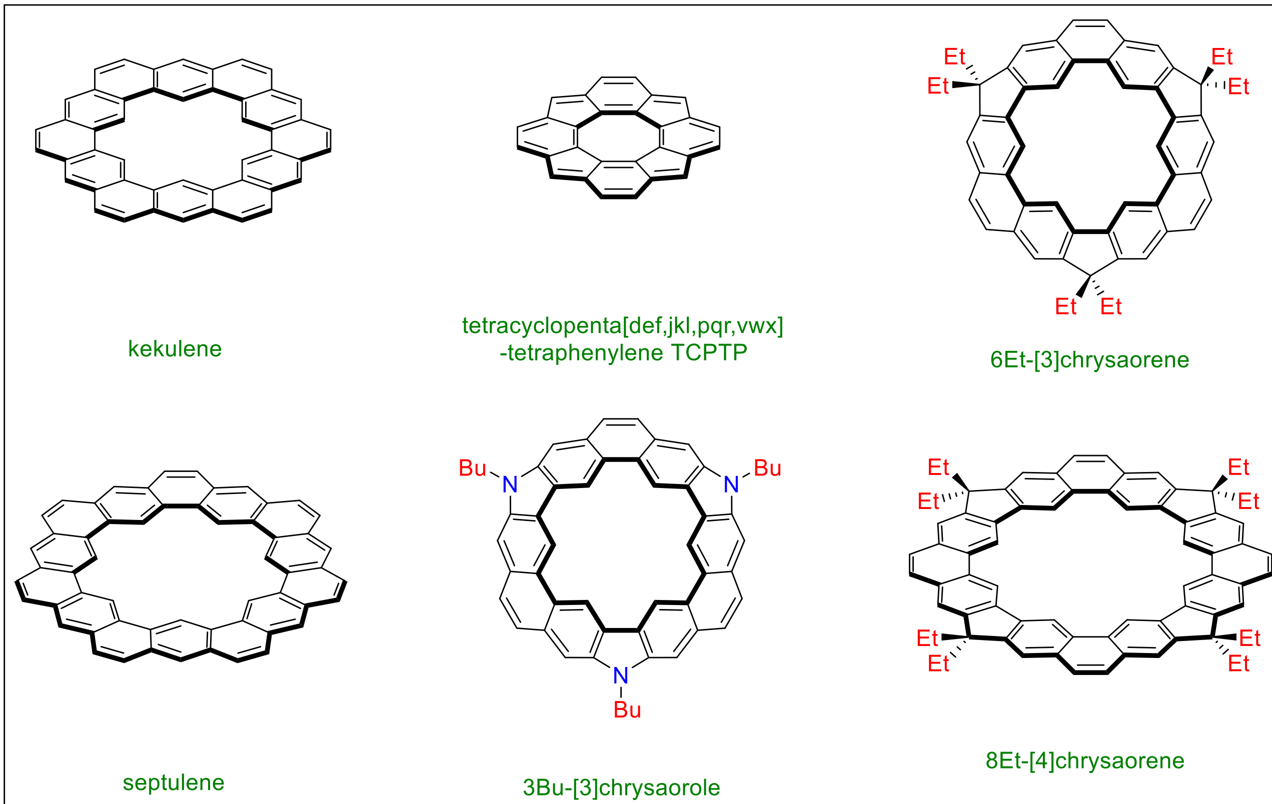

Fig 1. Coronoid hydrocarbons and related compounds.