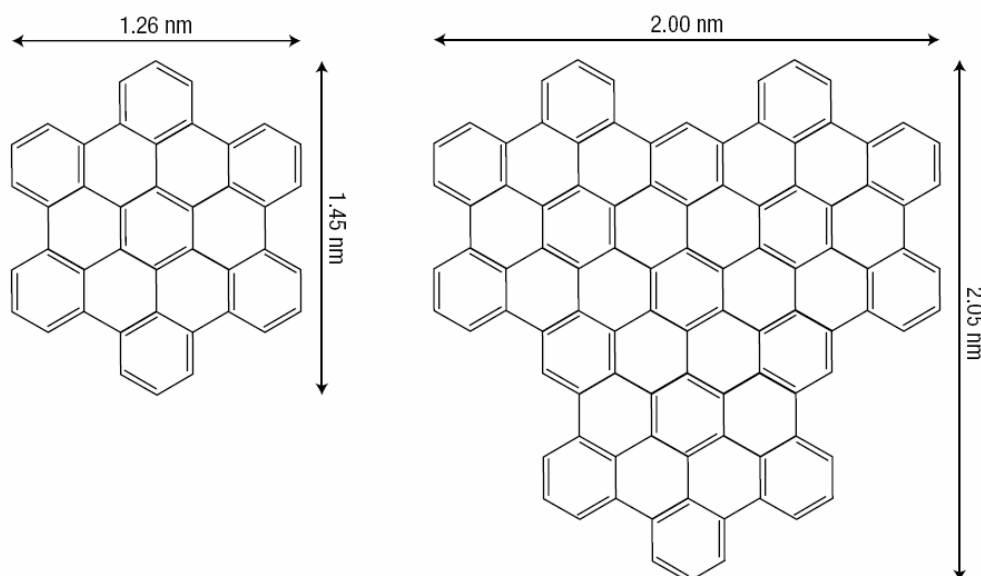


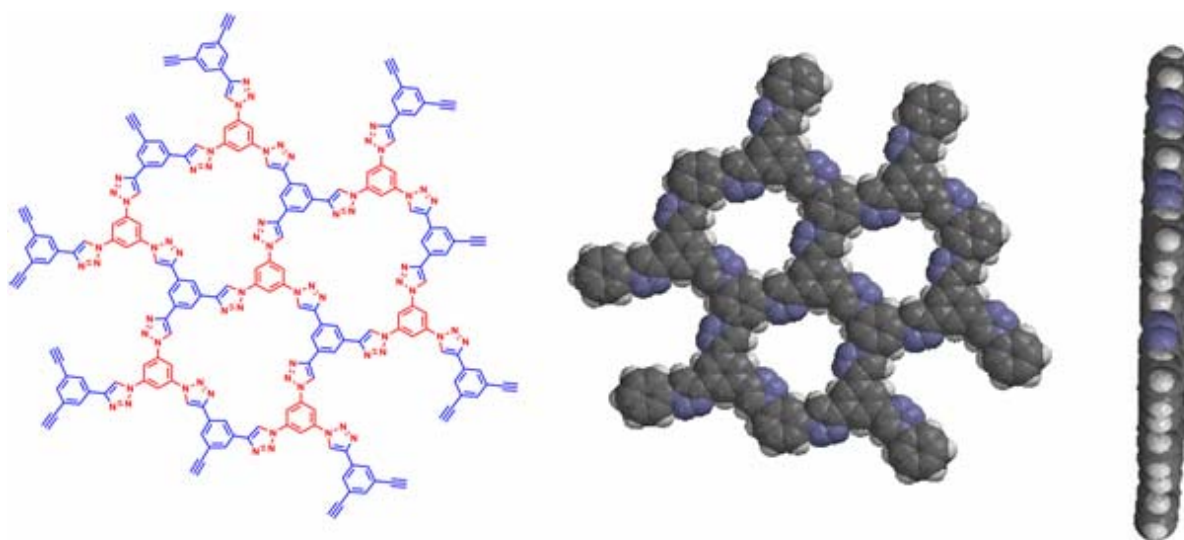
In 2004 Novoselov *et.al.* discovered that *graphene*, a single sheet of graphite consisting of hexagonal arrays of  $sp^2$ -hybridised carbon atoms, can be used in molecular electronics devices such as field effect transistors (FETs) and light emitting diodes (LEDs).

The research group of Klaus Müllen recently reported the synthesis of graphene-like sheets starting from hexabenzocoronenes (Figure 1). These materials have shown excellent charge conducting properties, however their preparation require huge synthetic effort, they are hard to functionalize and they show poor solubility.



**Figure 1:** hexa-*peri*-hexabenzocoronene ( $C_{42}H_{18}$ ), and super-phenalene ( $C_{96}H_{30}$ )

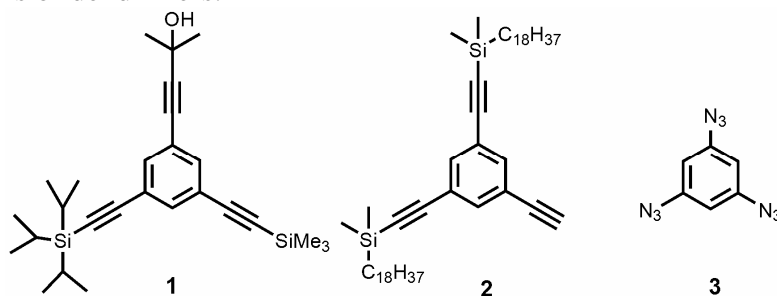
To overcome these issues, we have designed a dendritic molecule with a similar symmetry, and a structure based on benzene rings interconnected via triazole moieties (Figure 2). This class of molecules is expected to adopt an extended planar structure, which will be highly conducting upon doping.



**Figure 2:** 3<sup>rd</sup> generation dendrimer

Owing to the presence of acetylene groups in the molecule, it will be simple to use a variety of functional groups and thereby tune the properties of the resulting molecule. The presence of triazole moieties will also provide the ability to coordinate metal ions inside the dendrimer.

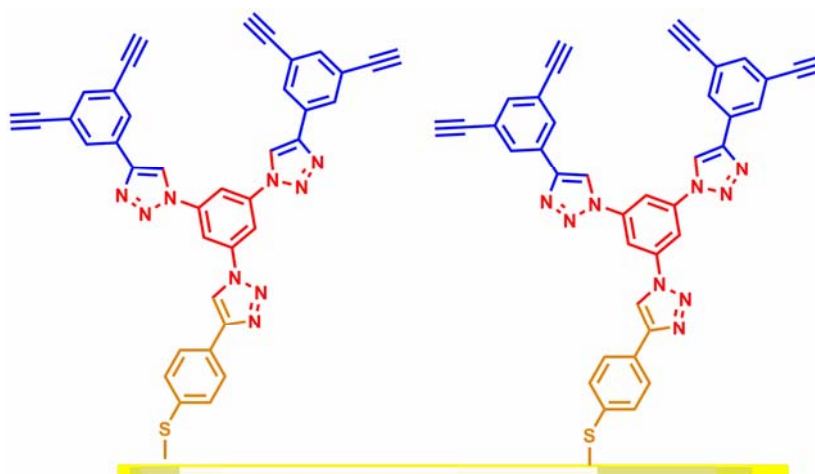
The synthetic approach is based on the Huisgen [1,3]-dipolar cycloaddition, where functionalized benzene trisacetylenes and benzene trisazides are *clicked* together forming the resulting dendrimer. Selectivity is achieved mainly by using different acetylene protecting groups, which are introduced via a variety of Sonogashira *cross-coupling* reaction of aryl halogens and silylated acetylenes. The starting materials for these *click* reactions are functionalized phenyl acetylenes, which possess either different protecting groups (**1**), which can be selectively deprotected, or long alkyl protecting groups (**2**), which provide solubility to higher generations of dendrimers.



**Figure 3:** Monomers

The azide monomer (**3**) used in our synthetic approach is prepared from 3,5-diaminoaniline using a diazo transfer reagent.

Furthermore we will modify the synthetic strategy to grow the dendrimers on a gold surface. This approach will provide a better control in each step of the dendrimer growth (Figure 4).



**Figure 4:** Dendrimer growth on a gold surface