Building graphene materials by combining organic synthesis and surface science

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The development of atomic force microscopy (AFM) and scanning tunnelling microscopy (STM) with functionalized tips has allowed the visualization of molecules adsorbed on different surfaces with submolecular resolution. This advance, together with the possibility to induce on-surface chemical reactions, opens up exciting applications in chemistry and materials science.[1]

In this talk, I will comment on how these breakthroughs in AFM/STM, in combination with organic synthesis, allowed us to obtain and characterize graphene-like nanostructures. In particular, I will discuss the synthesis and characterization of nanographenes such as cloverphenes (Fig 1A), dendripenes (Fig 1B)[2] and kekulene (Fig 1C). In addition, I will comment on the preparation of porous nanographenes (Fig 1D-E)[3] by combining solution chemistry and on-surface synthesis, as well as large acenes (Fig 1F)[4] and our first efforts towards the on-surface generation of cyclacenes (Fig 1G).[5]

References

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Figures

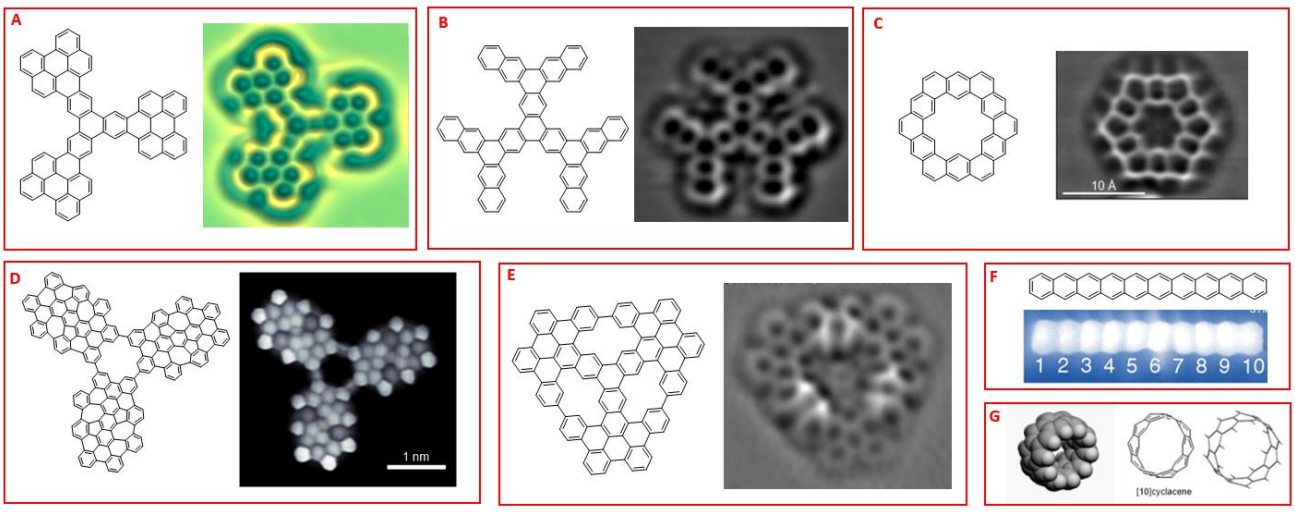

Figure 1. Selected examples of graphene molecules described in this lecture.