

Combining Organic Chemistry with Surface Science: from Benzyne to Graphene and Single-Molecule Reactions

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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.^[1] This breakthrough, together with the possibility of inducing on-surface chemical reactions with the tip of the microscope,^[2] opens exciting applications of AFM/STM in chemistry and materials science.

Our group at CiQUS is specialized on the synthesis of large aromatic molecules. In this lecture I will illustrate the great potential of combining synthetic organic chemistry with surface science, by summarizing selected projects which were developed in close collaboration with groups specialised in AFM/STM. In particular, I will focus on the generation of organic intermediates (e.g. arynes),^[3] the characterization of elusive molecules (e.g. large acenes and triangulene derivatives),^[4-5] the synthesis of graphene materials (e.g. nanoporous graphenes and chiral graphene nanoribbons),^[6-7] and the study of single-molecule reactions.^[8]

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