

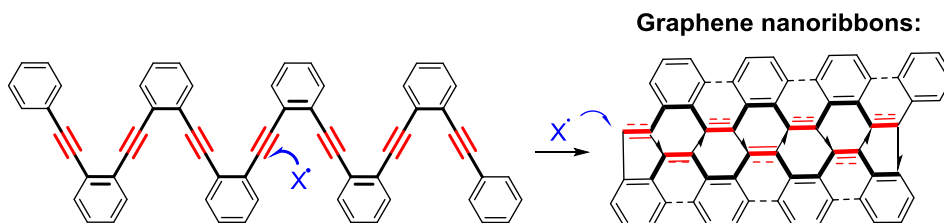
Stereoelectronic control of alkyne cyclizations and cycloadditions: towards precisely shaped and functionalized carbon nanostructures and faster click chemistry

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New chemical reactions opens new opportunities for controlling life and matter at the molecular level. I will illustrate how one can use sequential chemical transformations from one of the simplest organic functional groups for solving two different problems: 1) bottom-up approaches to conjugated carbon nanostructures, and 2) faster bioorthogonal chemistry.

In the 1st part, I will outline cascade transformations for the bottom-to-top preparation of carbon nanostructures for molecular electronics (graphene nanoribbons). In our approach, alkyne chains of varying sizes, shapes and functionalities, are built in a modular fashion and “zipped” up into graphene substructures via controlled radical polymerization. The success of this approach is based on the newly redesigned rules for alkyne cyclizations.



In the 2nd part, I will discuss selective Transition State stabilization in the design of non-catalyzed alkyne-azide cycloadditions for bioorthogonal chemistry. Paradoxically, this approach promises the click reagents which are more stable but also more reactive than strained cycloalkynes.

A perfect match?

