Reactivity of polyynes : complex molecules from simple carbon rods.

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Polyynes are linear carbon rods that may be regarded as models of carbyne – still elusive linear allotropic form of carbon. This microreview addresses the use of polyynes as synthetic precursors of complex organic and organometallic compounds. Application of such unusual molecules as starting materials for various chemical transformations leads to products which often are not easily accessible using “traditional“ approaches. Polyynes may for instance be used in the synthesis of molecular wires, materials possessing high nonlinear optical response, complex donor–acceptor systems, solvatochromic fluorescent dyes or natural products. The most significant challenge here is to control the regioselectivity of a transformation of such linear sp-hybridized carbon chains. The impact of steric and electronic properties of reagents on the reaction pattern is hence highly important and will be discussed. Moreover, the transformations of end-groups will also be addressed since their reactivity might very often be different than that of acetylenes.

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