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Synthesis of Cyanopolyynes for Photochemical and Spectroscopic Studies

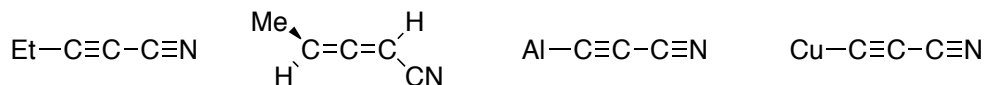
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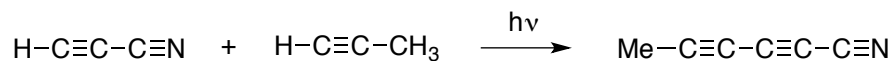
Introduction: Cyanoacetylene is an ubiquitous compound observed in the Interstellar Medium (ISM), comets and the atmosphere of Titan. Derivatives as well as higher homologues are of a great interest to have a better understanding of the syntheses and properties of these 1-alkynyl cyanides in the Universe.

Results: Substituted cyanoacetylenes as well as metallic derivatives and isomers have been synthesized and analyzed by microwave spectroscopy but to date none has been detected in the ISM (Scheme 1).[1]



Scheme 1

To have in hand cyanobutadiyne and the methyl derivative, both compounds detected in the ISM, allowed photochemical studies starting from acetylene or propyne and cyanoacetylene to evidence the formation of such diynes derivatives in the gas and the solid phases (Scheme 2).[2]



Scheme 2

Bromocyanoacetylene (Br-C≡C-CN) has been used to generate C₃N⁻ and to study the kinetic of decomposition of this anion at room and low temperature, simulating the chemistry of this anion versus several compounds. This study has been extended to C₅N⁻ starting from BrC₅N recently synthesized in our lab.[2,3]

All these studies give a better knowledge of the chemical behavior of these 1-alkynyl cyanides which is occurring in many places of the Universe.

References:

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