PHOTOCHEMICAL ISOMERIZATION OF NORBORNADIENE-CONTAINING POLYTRIAZOLES OBTAINED BY CLICK CHEMISTRY POLYADDITION

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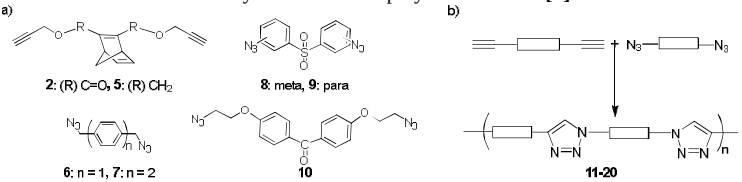
The increasing energy consumption and the rapid depletion of fossil resources are the driving forces to develop new technologies to harvest the solar energy. A promising method for the conversion, storage and release of solar energy is to rely on the photochemical valence isomerization (PVI) of norbornadiene (NBD) into quadricyclane (QC). However the introduction of chromophores into the NBD molecules is necessary since NBD does not absorb in the visible light region. The use of this photoinitiated reaction in polymer materials has been widely discussed **[1]**. Recently Ben Romdhane and coworkers have detailed the synthesis and photochemical properties of polyimides **[2]** based on pentamethylated-NBD units as well as polyamides **[3]**, obtained by polycondensation of dianhydride and carboxylic acid NBD derivatives with different aromatic diamines.
Since the advent of the click chemistry philosophy in 2001 by Sharpless and coworkers **[4]**, it has been an immense source of inspiration for the design of advanced multifunctionnal materials **[5]**. The most studied and reliable click reaction to date is the copper-catalysed azide-alkyne cycloaddition (CuAAC). The step growth polymerization of different diazides and dialkynes (AA+BB) or α-azide-ω-alkynes (AB+AB) to obtain linear polytriazoles and polytriazoles networks has been widely studied **[6,7]**. Herein we present the CuAAC polyaddition of dialkynes **2** and **5** with different aromatic diazides **6-10** to build a series of NBD-containing polytriazoles suitable for PVI (Scheme 1). The resulting polytriazoles have been characterized by ^{1}H NMR, SEC, TGA and DSC. The PVI of the NBD residues into QC units was investigated by UV/vis spectrophotometry from polymer films and was demonstrated for the first time by ^{1}H NMR from polymer solutions.**[8]**



Scheme 1. a) Diazide and dialkyne monomers; b) polytriazoles obtained by CuAAC polyaddition.

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