Recent Advances in the Synthesis of Aliphatic Polyesters by "Click" Chemistry

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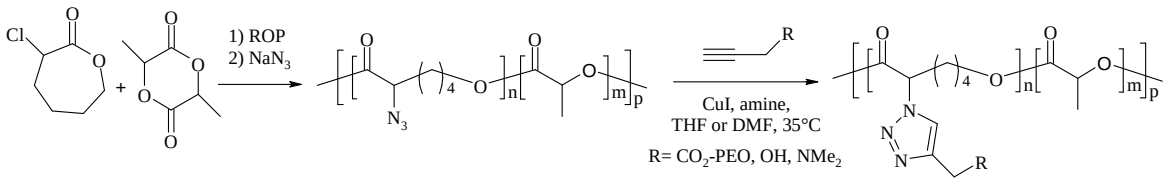
Since the discovery of Sharpless and Meldal, the copper(I)-catalyzed azide-alkyne cycloaddition (CuAAC) is more and more popular in the field of macromolecular engineering owing to its robustness, its high tolerance to a wide range of functional groups without any need of protecting groups and the absence of side-products. This reaction is known to be a very efficient "click" reaction as defined by Sharpless.
The chemical modification of aliphatic polyesters remains, at the time being, a very difficult task to achieve because of the very limited number of efficient chemical reactions, which can be implemented in the absence of chain degradation.
The main purpose of this contribution is to report on the most recent advances on the use of CuAAC to derivatize aliphatic polyesters (Scheme 1). Interestingly enough, it was recently shown that CuAAC carried out onto aliphatic polyesters attached with either azides or alkynes is very efficient under mild conditions, which limit undesirable degradation. Several functional groups were grafted onto aliphatic polyesters by CuAAC without using any protection/deprotection reactions. The CuAAC is also very efficient to prepare aliphatic polyesters with various architectures as highlighted by the synthesis of graft copolymers, star-shaped copolymers and networks. This "click" chemistry has been combined with other polymerization mechanism such as ATRP in order to extend further the range of available polymers.



Scheme 1. Synthesis of functional copolyesters by CuAAC

References

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