

CLICK REACTION IN SUPERCRITICAL CARBON DIOXIDE: TOWARDS THE SYNTHESIS OF FUNCTIONAL POLYMERS IN A GREEN MEDIUM

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Since their description as a new class of reactions by Sharpless et al., "click" reactions have gained an increasing attention. Particularly, the Cu(I) catalyzed "click" cycloaddition reaction of azides and alkynes, or Huisgen's 1,3-dipolar cycloaddition, has become very popular during the last years in polymer chemistry, as a useful tool for the functionalization of synthetic macromolecules and for synthesizing a wide range of polymer architectures. Indeed, Huisgen's 1,3-dipolar cycloaddition proceeds under mild reaction conditions and is tolerant to a broad variety of functional groups. Moreover, the coupling of an azide with an alkyne leads to the selective formation of a chemically very stable 1,4-disubstituted triazole ring. Finally, no undesirable by-products were formed after reaction. In this work, alkyne-azide Huisgen's 1,3-dipolar cycloaddition was investigated in scCO₂. The concept of click reaction was first implemented to the modification of CO₂-phobic aliphatic polyesters, providing functional biocompatible and biodegradable materials. Then, it was successfully extended to the synthesis of end-functionalized polymers by simultaneous Huisgen's 1,3-dipolar cycloaddition and dispersion Atom Transfer Radical Polymerization (ATRP) of vinyl monomers in scCO₂.