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Glycerol-Based Co-Oligomers by Free-Radical Chain Transfer Polymerization: Towards Reactive Polymers Bearing Acetal and/or Carbonate Groups with Enhanced Properties

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Abstract

Oligomers coming from glycerin carbonate acrylate (GCA) and solketal acrylate (SolA) were synthesized in good yields by free-radical chain transfer polymerization using 2-mercaptoethanol (ME) as chain transfer agent. These oligomers were totally soluble in solvents and did not exhibit branching or gelation. The efficiency of the chain transfer polymerization process on these glycerol-based acrylate monomers was demonstrated and reactive cotelomers bearing both acetal and cyclocarbonate groups were obtained. The structure of these oligomers was well-characterized by NMR, SEC, FTIR and MALDI-Tof spectroscopies. The oligo(GC-*stat*-Sol)s are particularly interesting, notably in terms of reactivity and solubility in various organic solvents and water that can be modulated by varying different SolA/GCA ratios. These results open the way to a widespread valorization of glycerol.

KEYWORDS: Glycerol, hydrolysis, oligomers, radical polymerization.

†Electronic Supplementary Information (ESI) available: [characterization by ¹H NMR and FTIR spectroscopy].

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