

Synthesis of complex architectures based on poly(N-Vinylpyrrolidone) through Reversible Addition Fragmentation Chain Transfer Polymerization (RAFT)

Kokkorogianni Olga, Pitsikalis Marinos

Laboratory of Industrial Chemistry, Department of Chemistry, National and Kapodistrian University of Athens, Zografou GR-15771, Greece

e-mail: olga.kokkorogianni@gmail.com

The synthesis of complex architectures of poly(N-vinylpyrrolidone) through various routes has been extensively explored. Both syntheses of PNVP star-shaped homopolymers were based on the arm first strategy, hence the pre-prepared branch was later either conjugated on a multifunctional core or cross-linked using a difunctional monomer as the core. In the latter course Divinylbenzene (DVB) was employed as the cross-linker following the synthesis of the arm of PNVP. In addition to the synthesis of star-shaped homopolymers of PNVP we employed tris(2-aminoethyl)amine as the multifunctional core, on which the PNVP arm was conjugated via an amide bond formation .

Finally, PS-b-PNVP along with PEO-b-PNVP copolymers were synthesized, making use of Reversible Addition Fragmentation Chain Transfer (RAFT), polymerization. To begin with, the synthesis of a polystyrene and a poly(ethylene oxide) macro-RAFT agent took place, which were later used for the block copolymerization of N-vinylpyrrolidone.

All the aforementioned materials were characterized structurally and molecularly by Gel Permeation Chromatography (GPC), Nuclear Magnetic Resonance Spectroscopy (NMR) and Static Light Scattering (SLS).

References:

- 1) McDowall, L., Chen, G. & Stenzel, M. H. *Macromolecular Rapid Communications* 29, 1666-1671 (2008).

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