

# Statistical copolymers of N-Vinyl Pyrrolidone and 2-Chloro Ethyl Vinyl Ether via Radical RAFT Polymerization as scaffolds for the synthesis of complex macromolecular architectures

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This study involves the synthesis of statistical copolymers of N-Vinyl Pyrrolidone, NVP, and 2-Chloro Ethyl Vinyl Ether, CEVE, via Radical polymerization utilizing the Reversible Addition-Fragmentation Chain Transfer, RAFT, technique. The initial phase of the research was dedicated to promote radical copolymerization of the two monomers, since radical polymerization of Vinyl Ether monomers, VEs, has not been previously reported in the literature in the absence of additives. Following the optimization of the copolymerization conditions, a series of statistical copolymers with varying ratios of monomer supply, were purposely synthesized at low conversions, thus enabling the calculation of the reactivity ratios. These findings, in conjunction with the statistical structure analysis of the P(NVP-stat-CEVE) copolymers, demonstrated that they possess a pseudo-diblock structure. The thermal properties of the copolymers were investigated, and the outcomes were evaluated in comparison with the behaviour of the corresponding PNVP and PCEVE homopolymers. In conclusion, the presence of pendant chlorine groups attached to the copolymer chain enables their use as scaffolds for the synthesis of complex macromolecular architectures, as they can be efficiently substituted by other groups, including hydroxyl groups and azides. These groups can be exploited for the formation of graft copolymers, utilizing the “Grafting From” and “Grafting To” techniques, respectively.

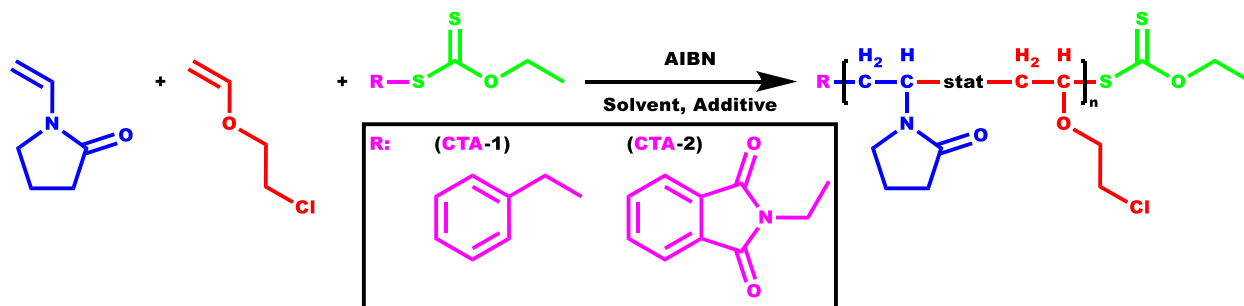


Figure 1. Synthesis of P(NVP-stat-CEVE) via RAFT polymerization technique.

## References

- [1] N. V. Plachouras, M. Pitsikalis. *Polymers* 15:8 (2023) 1970.