Polymerization-Induced Self-Assembly

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Polymerization-Induced Self-Assembly is a dispersion polymerisation in which the growing chain turns insoluble at a critical length and assembles into a particle while it grows. The process gives a block copolymer particle at a high solids content, because the monomer itself is the solvent of the first block. A reversible-deactivation radical route keeps the chain growing, and the assembly can be run in water or in an alcohol [1]. The morphology moves from a sphere to a worm and then to a vesicle as the stabiliser block shortens, and that sequence is now predictable enough to serve as a design tool [2]. A crystallisation-driven variant nucleates the assembly on a crystalline core, and the rod that forms is longer and more uniform than the sphere [3]. A photocontrolled route starts and stops the polymerisation with light, so the assembly can be frozen at an intermediate state [4]. When the same chemistry is compared with a miniemulsion, the nucleation route decides whether a particle or a monomer droplet is the site of the assembly [5].

dispersion polymerization | block copolymer | self-assembly | raft polymerization | nanoparticle morphology | worm-like micelle | vesicle formation

References

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