

MaMaSELF



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Self-assembly of polymeric bottle brushes in aqueous solutions

Molecular brushes, characteristic for their unique architecture, consist of a polymeric backbone with densely grafted side chains. When a molecular brush contains both hydrophobic and hydrophilic segments, its special self-assembly behavior in water makes it a potential drug carrier in the human body. Poly(2-oxazoline)-based molecular brushes are especially well-suited to this purpose due to their high biocompatibility.

In the present work, morphological study on poly(2-isopropenyl-2-oxazoline)-g-poly(2-ethyl-2-oxazoline) dilute aqueous solution has been accomplished with respect to particle size and inner structure dependence on temperature ranging from 25°C to 50°C. With its hydrophobic backbone and hydrophilic side chains, experimental results from dynamic light scattering show two different sizes for the molecular brush, approximately 5 nm and ranging from 120 nm to 220 nm. As a further step, small-angle neutron scattering experiment was performed, leading to a disk-like brush, partially packed, with an effective radius of approximately 14 nm.

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