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Thermal Response of PNIPAM Brushes Studied by Numerical Self-Consistent Field Calculations DONG MENG, QIANG WANG, Department of Chemical and Biological Engineering, Colorado State University — Unlike most polymers, poly(N-isopropyl acrylamide) (PNIPAM) exhibits a lower critical solution temperature in water, i.e., PNIPAM chains are soluble (expand) at low temperatures and insoluble (collapse) at high temperatures. This property has been used to create "smart" surfaces of PNIAPM brushes that can switch wettability, porosity and cell-adhesion properties as temperature is changed. Such thermal response of PNIPAM brushes are strongly affected by both chain length and grafting density. In this study we use numerical self-consistent field calculations with a composition-dependent Flory-Huggins parameter obtained from experiments to study the thermal response of PNIPAM brushes. The effects of chain length and grafting density are systematically investigated to provide guidance to experimental design of PNIPAM brushes for targeted applications.

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