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Polymer size and affinity effects on nanopore adsorption with a wide range of pore sizes CHANSU KIM, CHANG YEOL RYU, Department of Chemistry and Chemical Biology, Rensselaer Polytechnic Institute, NY 12180 — We study polymer nanopore adsorption in solution using nanoporous silica and investigate how these processes differ from those on flat surfaces. In particular, we studied the adsorption of monodisperse polystyrenes onto nanoporous silica with an average pore size ranging from 8 to 100 nm at various solvent quality conditions. We found that the polymer nanopore adsorption phenomena were greatly affected by time, temperature, concentration and solvent quality. In general, the surface excess of polystyrene adsorption exhibits a maximum when the radius of gyration is similar to that of the small pores. However, in large pores, the polystyrene shows the maximum adsorption when the radius of gyration was approximately half the diameter of the pores. This result reveals that the polymer entanglement due to steric crowding at the nanopore entrance on the outer surface has a critical role for controlling diffusion and the subsequent adsorption into the pore.

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