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Multivalent Nanoparticles: adsorption and organization of bidisperse polymer chains onto a solid interface FOLUSHO OYEROKUN, RICHARD VAIA, JOHN MAGUIRE, BARRY FARMER, AFRL — Multivalent nanoparticles, i.e. nanoparticles with two or more ligands attached to their surfaces, are used in a variety of scientific and technological applications. The most common protocols for synthesizing these multivalent nanoparticles involves immersion of the particles into a solution containing the various ligands or into a solution containing an excess of one ligand to drive a partial (solvent mediated) exchange reaction with a previously bound ligand. Despite intense experimental activities, the dependence of the surface coverage on free ligand concentration and solvent quality is still poorly understood. This study addresses the thermodynamics of adsorption of bidisperse end-functionalized polymer chains in a good solvent onto a flat surface. At equilibrium, the absorbed chains form a bidisperse polymer brush in contact with the solution. The role of the degree of bidispersity, adsorption energy, solvent quality on monomer concentration profile, brush height and degree of penetration of free short and long chains into the brush layer will be discussed.

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