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Design of Optimal Surface Topographies for Low Fouling Surfaces by Computer Simulation PHILLIP SCHOCH, JAN GENZER, North Carolina State University — Biofouling is a major problem affecting many industries ranging from shipping to medical implants. Recent work in had pointed towards the importance of surface topography in limiting the adhesion of biofouling agents. Here we report on a Monte Carlo model to simulate the adhesion of spherical particles with sticky polymeric hairs on a variety of surfaces that possess sinusoidal variation of amplitude and periodicity in an effort to design the optimal set of surface attributes. We explore adhesion of such particles with varying diameter and the number and length of hairs on a range of sinusoidal periodic surface structures. This approach allows us to establish the optimal surface parameters minimizing the adhesion of particles with varying properties. Specifically, we will report that surfaces with very large or very low periodicity are nearly indistinguishable from flat supports (in some cases they even perform worse). Optimal surfaces are those whose periodicities are comparable to the "hydrodynamic size" of the particle (i.e., particle and hair). Additionally the role of amplitude has been less significant than wavelength as long as the amplitude of the surface corrugation is larger than the size of the particle. We have also developed an order parameter that characterizes how well the particles organize over the periodic structures on the surface.

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