

MAR11-2010-001982

Abstract for an Invited Paper
for the MAR11 Meeting of
the American Physical Society

Polymer brushes: Tools for surface design¹

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Polymers brushes are ideal materials for interfacing with biological systems as they share many of the same molecular components and properties. Polymer brushes provide remarkable screening power in shielding a substrate from the environment through both steric and charge interactions. However, the majority of biomolecular species will still non-specifically bind to polymer brush surfaces unless some care is given to molecular design. Several polymer brush systems are described to control interaction of biomacromolecules and cells by design of specific and non-specific interactions in polymer brush architectures. “Grown from” and block copolymer brushes are described, both of which provide excellent substrates for study of brush surfaces. Examples of polymer brushes used for sensor creation and for investigation of cellular interaction are given. Brushes used in non-fouling coatings tailored for marine applications and in which amphiphilic structures play an important role are also described.

¹Support from both NSF and ONR is gratefully acknowledged.