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Elastic Properties of Lysozyme Confined in Nanoporous Polymer Films HAOYU WANG, PINAR AKCORA, Stevens Inst of Tech — Retaining the conformational structure and bioactivity of immobilized proteins is important for biosensor designs and drug delivery systems. It is known that confined media provide a protective environment to the encapsulated proteins and prevent diffusion of the denaturant. In this study, different types of proteins (streptavidin, lysozyme and fibrinogen) were chemically attached into the nanopores of poly(methyl methacrylate) thin films. Heterogeneous flat surfaces with varying cylinder pore sizes (10-50 nm) were used to confine proteins of different sizes and shapes. Stiffness of protein functionalized nanopores was measured in nanoindentation experiments. Our results showed that streptavidin behaved more stiffly when pore dimension changed from micron to nanosize. Further, it was found that lysozyme confined within nanopores showed higher specific bioactivity than proteins on flat surfaces. These results on surface elasticity and protein activity may help in understanding protein interactions with surfaces of different topologies and chemistry.

Haoyu Wang
Stevens Inst of Tech

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