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Protein denaturing on Nanospheres JAMES FORREST, JONATHAN TEICHROEB, University of Waterloo — We have used localized surface plasmon resonance (LSPR) to monitor the structural changes that accompany thermal denaturing of Bovine Serum Albumin(BSA) adsorbed onto gold nanospheres of size 5nm-60nm. The effect of the protein on the LSPR was monitored by visible extinction spectroscopy. The position of the resonance is affected by the conformation of the adsorbed protein layer, and as such can be used as a very sensitive probe of thermal denaturing that is specific to the adsorbed protein. The results are compared to detailed calculations and show that full calculations can lead to significant increases in knowledge where gold nanospheres are used as biosensors. Thermal denaturing on spheres with diameter $>$ 20 nm show strong similarity to bulk calorimetric studies of BSA in solution. BSA adsorbed on nanospheres with d$\leq$ 15 nm shows a qualitative difference in behavior, suggesting a sensitivity of denaturing characteristics on local surface curvature. Studies of isothermal denaturing kinetics were used to obtain an activatiuon barrier for thermal denaturing. This activation barrier also exhibited a strong dependence on nanoparticle size. These results may have important implications for other protein-nanoparticle interactions.

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