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Anomalous Formation of Multilayer Protein Aggregates on the Surface of Nanotubular TiO_2[1] JACOB FORSTATER, ALFRED KLEINHAMMES, YUE WU, Department of Physics and Astronomy, University of North Carolina at Chapel Hill — Significant evidence links protein aggregation to the pathology and progression of most protein misfolding diseases. Protein aggregation also poses a significant problem for the safe and cost-effective production of therapeutic proteins. A comprehensive understanding of these problems requires both a detailed understanding native protein-protein interactions as well as an understanding of how protein-material interactions may alter protein aggregation phenomenon. Here we report on the anomalous formation of multilayered protein aggregates of globular proteins on the surface of TiO_2 nanotubes. Our findings suggest that minor alterations of the surface hydration properties of the nanotubes may drastically alter protein aggregation phenomenon. We further highlight the role of electrostatic and Van der Waals forces in this aggregation process.

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