467a Engineering Protein Activity and Stability through Control of the Nanoscale Environment

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We have discovered a novel property of nanomaterials – their ability to enhance protein activity and stability. We report that single-walled carbon nanotubes (SWNTs) can significantly enhance enzyme function and stability in strongly denaturing environments. The enhanced stability was exploited in the preparation of highly stable and active nanocomposite films that completely resist nonspecific protein adsorption. The protein-nanotube conjugates represent a new generation of highly selective, active, and stable catalytic materials. Furthermore, we will show that by interfacing proteins with nanomaterials a range of applications can be considered including biosensing, diagnostics, vaccines, drug discovery, and drug delivery.