

Complex Nanomaterial Synthesis and Structural Characterization

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Abstract

Complex nanomaterials are at the heart of global biotechnology and nanotechnology initiatives, enabling applications ranging from cancer treatment and gene therapy to new vaccines against epidemic flu. Our laboratory has been advancing and refining the use of an electrospray-differential mobility analysis (ES-DMA) system to synthesize novel nanoparticle systems, characterize their multimodal size distributions and aggregation states, and then purifying specific populations. In this technique, particles suspended in aqueous solution are electrosprayed, separated by their charge-to-size ratio in a differential mobility analyzer, and then enumerated with a condensation particle counter or electrostatically deposited onto substrates for further analysis. This talk will describe the theory of operation of ES-DMA and highlight its ability to measure functionalized gold nanoparticles, deposit nanoparticles into cell culture, generate silk elastin like polymeric (SELP) nanoparticles, and evaluate virus-antibody binding stoichiometry.

Biosketch

Professor Leonard F. Pease III is currently a tenure-track faculty member in the Department of Chemical Engineering at the University of Utah. With research collaborations that span the U.S. and the globe, he specializes in development of nanotechnology, biotechnology, advanced medical technologies and virus characterization. He received a Ph.D. from Princeton University in Chemical and Materials Engineering, and completed a post-doctorate at the National Institute of Standards and Technology (NIST). He was honored with a Silver Metal Award from the U.S. Department of Commerce in 2008 for his work on nanoparticle characterization. Dr. Pease has over 35 publications and patents in print or in progress.