

Model Nanomaterials and New Measurement Tools for Studying the Environmental Fate and Biodistributions of Nanomaterials

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With ever increasing production and use of nanomaterials, attention has turned to understanding how their physical and chemical properties influence their fate and bioaccessibility in the environment. While numerous studies on this topic have emerged in recent years, many of the results are inconsistent or are difficult to apply broadly because of the use of poorly defined nanomaterials or inadequate measurement tools. To address these shortcomings, we have created model nanomaterials based on core-shell gold nanoparticles that have well controlled sizes and surface properties. These gold nanoparticles allow us to make clearer connections between nanoparticle surface properties and bioaccessibility to plants and animals. At the same time, we have developed new measurement tools based on mass spectrometry that allow these model nanoparticles to be sensitively tracked, and even imaged, in complicated biological samples. Through the use of these model nanoparticles and new measurement approaches, we are beginning to obtain insight into the design and synthesis of new materials that will ameliorate detrimental effects of nanomaterials on the environment.

Richard Vachet's Bio:

- Professor of Chemistry, University of Massachusetts Amherst
- Co-leader of Technical Research Group 3, Center for Hierarchical Manufacturing
- Research interests: development of new research tools to measure nanomaterials and proteins in complex biological samples; protein-nanomaterial interactions
- Recent member of Board of Directors, American Society for Mass Spectrometry