

Measurements, Instrumentation, and Standards for Nanomanufacturing

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Presentation

Abstract: Advanced manufacturing is one of the essential bridges between the discoveries of nanoscience and real world nanotech products. Advanced manufacturing is the vehicle by which the Nation and the World will realize the promise of major technological innovation across a spectrum of products that will affect virtually every industrial sector. For nanotech products to achieve the broad impacts envisioned, they must be manufactured in market-appropriate quantities in a reliable, repeatable, economical and commercially viable manner. Economy of scale is imperative. In addition, products must be manufactured so that environmental and human health concerns are met, worker safety issues are appropriately assessed and handled, and liability issues are addressed. Critical to this realization of robust manufacturing is the development of the necessary instrumentation, metrology, and accurate standards. Integration of the instruments, their interoperability, and appropriate information management are also critical elements that must be considered for viable nanomanufacturing. Advanced instrumentation, metrology and standards will allow the physical dimensions, properties, functionality, and purity of the materials, processes, tools, systems, products, and emissions that will constitute nanomanufacturing to be accurately measured and characterized. This will in turn enable production to be scaleable, controllable, predictable, and repeatable to meet market needs. If a product cannot be measured it cannot be manufactured.