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Introduction

Nanomanufacturing is the essential bridge between the discoveries of nanoscience and real world nanotech products. Nanomanufacturing 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 nanomanufactured products to achieve the broad impacts envisioned, they must be manufactured in market-appropriate quantities in a reliable, repeatable, economical, and commercially viable manner. In addition, they 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 nanomanufacturing is the development of the necessary instrumentation, metrology, and 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 measured and characterized.

This will in turn enable production to be scaleable, controllable, predictable, and repeatable to meet market needs. If a nano-product cannot be measured it cannot be manufactured; additionally if that product cannot be made safely it should not be manufactured. This proceedings introduces the Instrumentation, Metrology, and Standards for Nanomanufacturing Conference at the 2007 SPIE Optics and Photonics meeting. The goal is for this Conference to become the leading forum for the exchange of foundational information and discussion of instrumentation, metrology, and standards which are key elements for the success of nanomanufacturing.

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