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Geoffrey B. Smith

Michael B. Cortie

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Introduction

These are the inaugural SPIE proceedings on Nanocoatings and they form part of SPIE's inaugural Nanoscience and Engineering symposium. Nanoscale coatings of one type or another have been produced or studied for several decades, but interest in the topic has boomed and broadened in scope in recent times, along with the general growth in all things 'nano'. Nanocoatings underpin many emerging technologies and involve exciting and sometimes puzzling new science. Coatings whose properties depend on their nanostructure are of increasing interest for applications in solar energy, energy efficiency and storage, biosensors and medical therapies, photonics and telecommunications, and chemical processing. They can extend product lifetimes, self-clean, sterilise, or yield novel decorative properties. Many of these applications feature in the following papers, or can be addressed with the coatings discussed. These proceedings also include useful details on how to deposit these layers and how to control their nanostructure and optical response. Most of these studies used controlled deposition processes, which directly lead to the desired nanostructures. This eliminates the need for expensive post processing, apart in some cases from thermal annealing. Such techniques are essential for large area coatings, as for example in solar cells, some photocatalysis and advanced windows, but of course, they are also useful for any cost-sensitive device.

Films and layers whose plasmonic responses are unusual, but useful and interesting, are covered in several papers. Some of these nanocoatings conduct, while some are insulating but involve embedded conducting nanoparticles. A selection of the contributions focus on new optical and structural characterisation challenges that come up as we seek to understand what makes these coatings tick so as to better control their responses. These proceedings are also a testament to the multidisciplinary nature of the field with contributions from physicists, chemists, engineers, materials scientists, and bio-technologists. It is also worth noting that numerous other papers in this 2007 SPIE Annual Meeting report on nanocoatings within specific contexts, not only throughout the various other 'Nano'-conferences, but also in the Optics and Solar energy symposiums.

Geoffrey B. Smith
Michael B. Cortie

