Preface

As a physicist, it is a great honor for me to write the preface to this issue of *Pure and Applied Chemistry* (*PAC*), which focuses on the synthesis, characterization, and applications of nanostructured advanced materials. Nanoscale science and nanotechnology are rapidly advancing examples of the interdisciplinary nature of science and technology in the 21st century, requiring the mastery of a combination of chemical and physical techniques and a broad vision. In the study of material properties, the nanoscale is truly the interface between the two fundamental natural sciences, where size, geometry, and chemical species all play a significant role in determining the electronic and mechanical properties of nanostructured materials, and their subsequent biological and chemical activity. All these aspects are covered in the selection of papers presented here, written by both established and upcoming chemists, physicists, materials scientists, and technologists.

The 13 papers in this issue are selected from the invited presentations at the 3rd IUPAC Workshop on Advanced Materials (WAM III). This event is the third in a series devoted to the general theme of New Directions in Chemistry under the sponsorship of the International Union of Pure and Applied Chemistry (IUPAC). The Workshop was held on 5–8 September 2005 at the University of Stellenbosch in South Africa, and addressed the topic of Nanostructured Advanced Materials. Previous Workshops in this series were held in Hong Kong, 14–18 July 1999, and Bangalore, 3–16 February 2002. It is an indication of the importance of the science of nanomaterials that IUPAC continues to promote the advancement of interdisciplinary research and international collaboration in this area through these flagship workshops. In South Africa, this has been mirrored by the growth of the South African Nanotechnology Initiative (SANi), whose members, particularly at the student level, were lively participants of WAM III, and the recent launch, by the SA Department of Science and Technology, of a National Nanotechnology Strategy with a very strong focus on the characterization and basic properties of nanostructured materials.

The atmosphere of the workshop was fully in keeping with the interdisciplinary and international nature of the field, with invited speakers and participants representing a range of disciplines, including inorganic and organic chemistry, physics, materials science, process engineering, and electrical engineering, representing both academia and industry, and 25 countries from all five continents. The formal program consisted of 16 contributed posters, 34 invited talks, and 7 plenary lectures. Although the majority of presentations concerned the synthesis, characterization, and properties of nanoparticles (3 plenary and 8 invited talks), other themes of the workshop focused on nano-electronics (6 invited talks); nanotubes and fibers (1 plenary and 3 invited talks); bottom-up design and self-assembly (1 plenary and 5 invited talks); biorelated and general nanomaterials (5 invited talks); and device application and characterization (2 plenary and 7 invited talks). All of these talks have been made available for download from the University of Stellenbosch website at <http://academic.sun.ac.za/unesco/Conferences/Conference2005/programme.htm>. The WAM III program also incorporated a German-South African student symposium, with oral presentations from four German students and one South African student, and the annual general meeting of SANi.

Acknowledgments are due firstly to IUPAC for their continued support for the WAM series, and to the immediate past president Prof. P. S. Steyn for bringing the workshop to South Africa. In this regard, the support of the international organizing committee, and, in particular, Profs. C. N. R. Rao, P. O'Brien, and J. Wendorff, who gave plenary lectures. Another international organizing committee member, Dr. S. Mathur, organized the student symposium. The local organizing committee, comprising members from various local institutions, was chaired by Prof. R. D. Sanderson of Stellenbosch University, with all the organizational aspects ably handled by Ms. Aneli Fourie.

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Conference Editor