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IMEC 2009

Guest Editor's Editorial: Preface to the special section "Materials Engineering"

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The 14th Israel Materials Engineering Conference (IMEC-14) was held at Tel Aviv University on December 13–14, 2009. This conference was the most recent in an ongoing series of IMEC conferences initiated in 1981. IMEC conferences are considered pivotal for the Israeli materials community, bringing together scientists and engineers from academia and industry for presentation of recent results, the exchange of ideas, and initiation of joint scientific and technological collaborative programs.

What makes the IMEC conferences so popular is their broad scope, which encompasses all the main-stream fields of classic and modern materials science, from metallurgy to nanotechnology, and such a multi- and inter-disciplinary approach attracts not only materials scientists and engineers but also scientists from closely related disciplines, be it materials chemistry and physics, or electrical, mechanical and bio-engineering. IMEC 14 was the largest of the IMEC conferences so far, in terms of attendance, the number of presentations, and international involvement. More than 650 delegates from 13 countries attended 155 lectures in 20 parallel topical sessions and almost 170 posters. Traditional sessions, such as "Mechanical Behavior of Materials," "Polymers, Ceramics, and Composites," and "Electronic Materials and Thin Films," were held in parallel with their more contemporary counterparts, such as "Nanomaterials and Nanotechnologies" and "Materials in Biology and Medicine," reflecting the fast growing diversity of the materials discipline. Two new topical sessions were added for the first time, namely "Materials for Aerospace Applications" and "Materials for Archaeology." Twenty-nine distinguished guest speakers, including the President of Tohoku University, Prof. Akihisa Inoue, and MIT's Dean of Engineering, Prof. Subra Suresh, presented seven plenary talks in four plenary sessions, and numerous key note lectures, covering most recent breakthroughs in the fields of nanomaterials, biomaterials, materials for energy systems and cleantech, advanced characterization techniques, etc.

The selected articles published in this issue cannot convey the immense diversity and complexity of the topics presented and discussed at IMEC-14. The articles should rather be perceived as excerpts, aimed at providing a brief glimpse of IMEC-14. Plenary lectures from distinguished speakers are represented by the paper of Prof. Seeram Ramakrishna, Vice President for R&D of the National University of Singapore, who provided an extensive review on how fiber-based composites can serve as "nature's building blocks" in an ongoing quest for clean energy, water filtration, and regenerative medicine. On the other hand, papers by Gotman et al. and Gershon et al., have demonstrated the potential of composites as biomaterials, and nanomechanical characterization of polymer composites, respectively. Papers by Boxman et al. showed how thin films and coatings can be produced by vacuum arc deposition, and Tal-Gutelmacher et al. have indicated the importance of thin film technology for hydrogen storage. Mirchin et al. studied the morphology of thin polymer films with evanescent light microscopy. The paper by Ifergane et al. demonstrates how electron back-scattering diffraction can be used to monitor fracture of a specimen undergoing a tension test in situ, in a scanning electron microscope. Tripathi et al. described interesting quantum size effects in nanoparticles, and Beker et al. used nanotubes made of

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biomaterials (peptides in this case) as electrodes for a supercapacitor. Regev et al. employed more traditional methods of materials science, such as casting, to produce bulk metallic glasses.

I am grateful to all the participants, sponsors, and exhibitors for their invaluable input to the conference, be it scientific or social. Without them, scientists, engineers, and students alike, IMEC-14 would not have been as massively successful as it was. I would especially like to thank our distinguished invited guests, whose contribution to the conference's success was critical, and acknowledge those who contributed to this Special Issue. Finally, I wish to use this opportunity and to express my gratitude to our graduate students and Diesenhause Unitours for their dedicated help with the preparations as well as all sorts of expected and unexpected arrangements during of the Conference itself. Last, but not least, I wish to extend special thanks to the Conference Chairman, to the members of the Scientific Committee, and the Editorial Staff of the Journal of Materials Science for their help and guidance.