This issue of *ECS Transactions* (ECST) contains the manuscripts of the sixty three invited and contributed presentations scheduled for The Eighth International Symposium on High Dielectric Constant and Other Dielectric Materials for Nanoelectronics and Photonics, held in Las Vegas, Nevada on October 11 to 15, 2010. This symposium is sponsored by the Dielectric Science and Technology Division and the Electronics and Photonics Division of The Electrochemical Society, and will be held during the 218th Meeting of The Electrochemical Society.

The first Symposium in this series was held in Salt Lake City, October 20-24, 2002, in which thirty four plenary, invited, and contributed papers were presented. The second Symposium in this series was held in Orlando, Florida, on October 12-17, 2003, in which fifty six invited and contributed papers were presented. The third Symposium in this series was held in Los Angeles, California, on October 17-20, 2005, in which eighty nine invited and contributed papers were presented. The fourth Symposium in this series was held in Cancun, Mexico on October 30 to November 3, 2006, in which forty-seven invited and contributed papers were presented. The fifth Symposium in this series was held in Washington, D.C. on October 8 to 10, 2007, in which fifty-seven invited and contributed papers were presented. The sixth Symposium in this series was held in Honolulu, Hawaii on October 13 to 15, 2008, in which fifty-two invited and contributed papers were presented. The seventh Symposium in this series was held in Vienna, Austria on October 5 to October 7, 2009, in which forty seven invited and contributed papers were presented.

This issue of ECST is divided into twelve chapters, reflecting the sessions and the organization of the symposium. A wide range of topics are covered in this year’s symposium, including: High Mobility Channels, New and Novel Materials, Deposition and Manufacturing, Characterization, Flat-Band Voltage Anomaly and Control, Defects, Traps, and Reliability, and Memory.

At the third symposium (Los Angeles, 2004) of the series on high dielectric constant gate stacks, we introduced a new feature—the best paper award, which was won by Maureen MacKenzie of the University of Glasgow, UK, on the basis of her presentation and her manuscript entitled, “Advanced Nano-Analysis of High-K Dielectric Stacks”. The award was made possible by a donation from Anelva Corporation (now part of Canon Inc.) of Japan, and consisted of a citation and a check for US $1000. In the Cancun symposium (2006), the best paper (again facilitated by a donation from the Canon Anelva Corporation, Japan) was won by Daniel Lichtenwalner of the North Carolina State University, Raleigh, North Carolina, on the basis of the quality of both the manuscript and the presentation, entitled “Reliability and Stability Issues for Lanthanum Silicate as a High-K Dielectric”. In the Washington, D.C. symposium (2007), we instituted two best paper awards, one for the best presentation, and another for the best ECST manuscript, both of which consisted of a citation and a check for US $1000, and made possible by donations from the Canon Anelva Corporation, Japan, Semiconductor Diagnostics Incorporated, Tampa, Florida, and Aixtron AG, Aachen, Germany. While the best manuscript award was won by Koji Kita of the University of Tokyo, Tokyo on the basis of the quality of the manuscript entitled “Dramatic Improvement of GeO₂/Ge MIS
Characteristics by Suppression of GeO Volatilization”, the best presentation award was won by C. Driemeier of the Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil on the basis of his presentation entitled “Oxygen Species in HfO2 Films: An in situ X-Ray Photoelectron Spectroscopy Study”. At the Honolulu, Hawaii symposium (2008), the best manuscript award was won by K. Muraoka of the Toshiba Corporation, Japan on the basis of the quality of the manuscript entitled “Interface Engineering of a Metal/High-k/Ge Layered Structure by Water Vapor Discharge”, and the best presentation award was won by R. Wallace of the University of Texas, USA on the basis of his presentation entitled “In-Situ Studies of Interfacial Bonding of High-k Dielectrics for CMOS Beyond 22 nm”. At the Vienna, Austria symposium (2009), the award winners were Paul Hurley for the best presentation and G. Pourtois for the best manuscript for their papers: “Structural and Electrical Properties of HfO2/InxGa1-xAs Structures (x = 0, 0.15, 0.3, and 0.53): Paul Hurley; and “Modeling of Alternative High-k Dielectrics for Memory Based Applications: G. Pourtois, S. Clima, K. Sankaran, P. Delugas, V. Fiorentini, W. Magnus, B. Soree, S. Van Elshocht, C. Adelman, J. Van Houdt, D. Wouters, S. De Gendt, M. M. Heyns, and J. Kittl”.

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The editors deeply appreciate the very high quality contributions from the authors, and the excellent and comprehensive cooperation and support they received from the authors of the symposium. The authors were truly cooperative in honoring all our requests under severe time limitations. This truly high quality book owes the authors a great deal, and we are grateful to them.

We are pleased to acknowledge the financial support from the Dielectric Science and Technology Division and the Electronics and Photonics Division of The Electrochemical Society.

We deeply appreciate the contribution, the competence, and the dedication of the staff of The Electrochemical Society, particularly John Lewis, Beth Anne Stuebe, Stephanie Plassa, and Paul Urso, who helped us at various stages of the symposium, and during the publication period. The ECST online manuscript handling system is well organized and efficient, and we acknowledge John Lewis and his colleagues for running it competently.

Samares Kar
Michel Houssa
Sven Van Elshocht
Dolf Landheer
Durga Misra
Koji Kita

July, 2010
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Facts about ECS

The Electrochemical Society (ECS) is an international, nonprofit, scientific, educational organization founded for the advancement of the theory and practice of electrochemistry, electrothermics, electronics, and allied subjects. The Society was founded in Philadelphia in 1902 and incorporated in 1930. There are currently over 7,000 scientists and engineers from more than 70 countries who hold individual membership; the Society is also supported by more than 100 corporations through Corporate Memberships.

The technical activities of the Society are carried on by Divisions. Sections of the Society have been organized in a number of cities and regions. Major international meetings of the Society are held in the spring and fall of each year. At these meetings, the Divisions and Groups hold general sessions and sponsor symposia on specialized subjects.

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The International Symposium "Nanostructures: Physics and Technology" is held annually since 1993. The rst Symposium was initiated by Prof. Zh. By detailed investigation of the growth kinetics, we have achieved high quality 1.5 µm InAs QDs on GaAs and demonstrated high performance metamorphic QD lasers that exhibit, for the rst time, ultra low Jth (70 A/cm2), T0 = 2, fα~3dB = 5 GHz, chirp ≲ 0.3 Å, α ∼ 1.0, as shown in Fig.