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Photonic and Electronic Materials and Devices Based on III-V Compound Semiconductors: Critical Elements in Next-Generation Green Technology



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Abstract: The presentation will cover various photonic and electronic devices based upon III-V compound semiconductors and nanostructured materials with a focus on epitaxial layer structures and device physics. The material structures and devices include quantum-dot lasers (QD-L), visible light-emitting diodes (LEDs) and laser diodes (LDs) for solid-state lighting (SSL) applications, heterostructure field-effect transistors (HFETs) for high-efficiency high-voltage switching applications, and solar cells (SC) for terrestrial photovoltaic applications as critical elements in the systems for green way of energy harvesting and consumption. The aspects of device and materials physics, material-related technical issues, and state-of-the-art device technology will be described.

Biography: Jae-Hyun Ryou received the B.S. and M.S. degrees in metallurgical engineering from Yonsei University, Seoul, Korea, and the Ph.D. degree in materials science and engineering in the area of solid-state materials from the University of Texas at Austin, Austin, TX. From 2001 to 2003, he was with Honeywell Technology Center (HTC) and Honeywell VCSEL Optical Products, Plymouth, MN, as a Research Scientist. Before joining UH, he was with the Center for Compound Semiconductors at the Georgia Institute of Technology, Atlanta, as a Principal Research Engineer. He has authored or coauthored 4 book chapters of books, more than 120 technical journal papers (with citations of more than 1450), and more than 200 conference presentations/proceeding papers, and holds 8 U.S. patents. His current research interests include electronic and photonic materials, devices, and nanostructures based on III-V compound semiconductors with a focus on solid-state lighting and photovoltaic applications. He is a member of the Materials Research Society (MRS) and a senior member of the Institute of Electrical and Electronics Engineers (IEEE) and the Optical Society of America (OSA) and. He is currently serving as an associate editor of Optics Express (fields of solid-state lighting and photovoltaics) of the OSA.