Seminar Talk

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Tuesday, February 14, 2017
3:00 p.m. KH 224

Title: Application of SEM for characterization optoelectronic properties of semiconductors.

Abstract:
Scanning Electron Microscopy (SEM) is a widely used technique for the structural characterization of surface topography and composition of materials. In this talk we discuss the use of SEM for study of optoelectronic properties of crystallographic defects in semiconductor device structures. It is generally accepted that point or extended crystallographic defects severally modify or degrade optoelectronic properties of semiconductors. Therefore an identification and control of crystallographic defects are of particular importance. Cathodoluminiscence (CL) imaging/spectroscopy and Electron Beam Induced Current (EBIC) modes of SEM are of the few powerful techniques for imaging and studying the local recombination properties of crystallographic defects. Application of these techniques for study of defects in power devices, solar cells and infrared detectors will be presented. To extract quantitative information about recombination properties of individual defects and electronic transport properties of semiconductor material analytical and numerical models based on Monte Carlo electron beam-solid interaction simulation will be discussed.

Bio:

Dr. Sergey I. Maximenko received the Ph.D. degree in Electrical Engineering in the area of high power SiC devices at the University of South Carolina, Columbia. After completing graduate school he joined the Naval Research Laboratory in Washington D.C. to work in the field of wide bandgap materials for power applications as a Research Scientist. His current research focuses on crystal growth and structural & electrical characterization and semiconductor materials for III-V solar cells and II-VI based infrared detectors.