Metrology for Silicon Photovoltaics

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Abstract
In recent years, photovoltaic (PV) systems have emerged as a cost-competitive alternative to traditional energy sources like coal and nuclear power. PV represented 20% of new global electricity installations in 2015 and is now a $\approx$100 billion per year industry. Within the PV sector, crystalline silicon (c-Si) PV cells and modules dominate the market with >90% market share. c-Si PV is a platform for innovation with a stream of new materials (e.g., passivation layers, optical coatings, contact materials), manufacturing processes, and characterization techniques currently being explored by industry and academia. This seminar will cover recent advances in metrology for c-Si PV manufacturing, from fundamental investigations of the structure and composition of interfaces and films within these devices to the use of luminescence imaging as a means of performing detailed loss analysis of industrial PV cells and modules.

Biography
Dr. Kristopher O. Davis is an Assistant Professor in Materials Science and Engineering at the University of Central Florida (UCF) and a member of the Resilient, Intelligent and Sustainable Energy Systems (RISES) faculty cluster at UCF. His research is focused the development of new materials, manufacturing processes, and characterization techniques to improve PV technologies and speed up the adoption of PV as an energy source. This work is currently supported through multiple awards from the U.S. Department of Energy and from industry.
Previously, Dr. Davis was a Research Engineer at the Florida Solar Energy Center (FSEC) and the c-Si Metrology Program Manager for the U.S. Photovoltaic Manufacturing Consortium (PVMC), a DOE funded initiative in collaboration with SEMATECH. As a Program Manager in the PVMC, Dr. Davis worked with a number of companies across the U.S. PV supply chain to better understand the challenges facing the manufacturing sector and develop metrology solutions to these problems through collaborative R&D projects.

Dr. Davis received his B.S. in Electrical Engineering, M.S. in Optics, and Ph.D. in Optics, all from UCF. He is a peer reviewer for notable journals (e.g., *Nature Scientific Reports*, *Journal of Materials Research*, *Solar Energy Materials & Solar Cells*) and for national laboratories. Since 2012, he has co-authored over 20 peer-reviewed journal publications related to PV.