

Title Current Status and Research and Technology Opportunities in Photovoltaics

Speaker Prof. Angus Rockett

Time& Colorado School of Mines, US

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Abstract

This talk reviews the various photovoltaic technologies, recent advances in thin films, and opportunities for research to further photovoltaic energy. Worldwide, photovoltaic and wind generation is growing faster than any other technology with wind mostly in very large-scale systems. The International Energy Agency projects that wind and photovoltaics will be the dominant electric power generation technology worldwide in 2024, surpassing coal and natural gas. Photovoltaics continue to take advantage of the range of the option of practical application from very large to very small scales. In photovoltaics, silicon continues to dominate the market with great success in very high efficiency devices. In thin films, CdTe and Cu(In,Ga)Se₂ continue to be viable competitors, although the efficiency achieved in Si commercial products increasingly challenges these. The hybrid perovskites remain the most exciting new technology but continue to face stability challenges that may limit their viability long-term. The existing single-junction technologies are approaching their practical limits and tandem structures are of increasing interest and now represent a major focus of research, particularly hybrid perovskites combined with silicon. Finally, energy storage capabilities are increasing rapidly and represent enabling technologies for both wind and solar. Batteries and fuel cells continue to improve and their capacity in the world energy grids are growing fast. Each of these technologies have important research opportunities. The talk finishes with a brief review of the Rockett group's recent highlights in Cu(In,Ga)Se₂, CdTe, and hybrid perovskite materials and device research.

About the Speaker

ANGUS ROCKETT is a Professor in the Department of Metallurgy and Materials Engineering and the Colorado School of Mines and an Emeritus Professor in the Department of Materials Science and Engineering at the University of Illinois. He was President in 2011 and is a Fellow of the American Vacuum Society. He was the General Chair of the IEEE Photovoltaic Specialists Conference in 2016 and has held many positions with both the PVSC and the AVS. He received his B.S. in physics from Brown University and his Ph.D. in metallurgy from the University of Illinois. His research involves defects in semiconductors, primarily focused on synthesis and characterization of solar cell materials and theory and modeling of solar cell materials. He has applied a wide variety of materials microanalysis methods to study semiconductors. His group has done density functional theory, continuum elasticity, lattice Monte Carlo, and drift-diffusion modeling of materials and devices. He has also worked with reactive sputtering of nitrides and other materials. He is the author of one book (The Materials Science of Semiconductors), five book chapter contributions, more than 170 publications in archival journals, holds three sputtering- and/or photovoltaics-related patents, and has given more than 140 invited talks. He teaches courses in electronic materials and processing in addition to general materials science courses. He has presented short courses and tutorials in sputtering, materials microanalysis, and solar cells and solar cell materials for a variety of professional societies and organizations around the world.

Registration

https://zoom.us/webinar/register/WN_EUrRsitTRDikvX1izQYN1g

Host Prof. Chihaya Adachi

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