

Lyman Handy Colloquia

Metastable Materials for Opto-Electronics

Prof. Paul C. McIntyre

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Abstract:

Metastable phases have been a feature of materials technology for centuries, with hardening of steels by martensitic transformation being a conspicuous example that contributed greatly to the development of human civilization. More recently, there has been increasing interest in metastable phases for a broad range of applications including in opto-electronic devices and heterogeneous catalysts. This presentation will highlight several examples of metastable phase synthesis and structure control that our group has pursued to achieve unconventional functional properties, including a direct band gap in silicon-compatible, Group IV semiconductor alloy nanostructures and light-driven phase separation for wavelength-tunable photoemission from inorganic halide perovskite alloys. The importance of multi-modal characterization for probing the kinetics and length scales associated with metastable phase formation and resulting changes in electronic structure are emphasized.

Biography:



Paul McIntyre is Rick and Melinda Reed Professor in the School of Engineering, Professor Materials Science and Engineering, and of Photon Science, and Senior Fellow of the Precourt Institute for Energy at Stanford University. He is currently Director of the Stanford Synchrotron Radiation Lightsource, and was Chair of the Department of Materials Science and Engineering from 2014 to 2019. McIntyre was previously Member of the Technical Staff of the central research laboratories of Texas Instruments, and was a Director's-Funded Postdoctoral Fellow at Los Alamos National Laboratory. At Stanford, McIntyre leads a research team of graduate students, postdoctoral researchers and adjunct professors who perform basic studies of nanostructured inorganic materials for applications in electronics and energy technologies. He is best known for his

work on metal oxide/semiconductor interfaces, functional metal oxide thin films, atomic layer deposition, and semiconductor nanowires. McIntyre is an author of approximately 240 archival journal papers and an inventor of 9 US patents. He has given over 120 invited presentations, plenary talks and tutorial lectures on these topics. He has received two IBM Faculty Awards, a Charles Lee Powell Foundation Faculty Scholarship and an SRC Inventor Recognition Award. McIntyre was a GCEP Distinguished Lecturer in 2010 and received the Woody White Award of the Materials Research Society in 2011. In 2016, he was the inaugural Colorado School of Mines/NREL Materials Science Distinguished Lecturer.

Tuesday, August 27th, 2019.

4:00 pm – SLH 102

The Scientific Community is cordially invited.

