

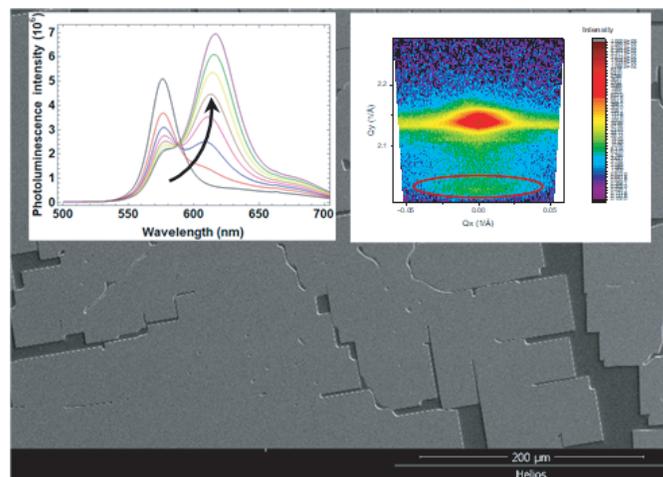
Metastable materials for Optoelectronics



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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.