

SES14-2014-000162

Abstract for an Invited Paper
for the SES14 Meeting of
the American Physical Society

Probing emission and plasmons in nanostructures in a scanning transmission electron microscope through combined spectroscopies¹

JORDAN HACHTEL, Vanderbilt University

The optical behavior of nanostructured materials is of significant interest across a variety of fields. Plasmonics and their relationship with emitters in nanoscale devices allow us to control light in a useable manner below the coherence. By understanding the nature of both emission and plasmonics at the local level we can move towards unlocking the full potential photonic devices. To this end we examine emitting ZnO nanowires with an insulating MgO shell that are decorated with plasmonic Ag nanoparticles. The tool used to study these structures is a scanning transmission electron microscope equipped for cathodoluminescence spectroscopy and electron energy loss spectroscopy alongside high resolution annular dark field imaging. The confluence of these different methodologies allow us to understand the nature of the plasmons and emissions in the ZnO structures at the nanometer level, and give us new ways to study optical properties at the nanoscale.

¹Funded by NSF-EPS-1004083h NSF-TN-SCORE, the U.S. Department of Energy DE-FG02-01ER45916, the Saudi National Science Fund, the DOE EERE SunShot Fundamental Program to Advance Cell Efficiency, and the DOE Office of Science BES-MSED