Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Intrinsic and extrinsic effects on electron-phonon coupling strength in individual ZnTe nanowires: The effects of laser annealing and metallic Te JASON MARMON, Nanoscale Science Program, UNC-Charlotte, TAO SHENG, HAITAO ZHANG, Mechanical Engineering & Engineering Science, UNC-Charlotte, YONG ZHANG, Electrical & Computer Engineering, UNC-Charlotte — Electron-phonon coupling is typically studied as an intrinsic property for a given bulk material, and modifying the coupling has been explored in a nanostructure. We point out that the coupling strength can be easily perturbed both significantly and unintentionally. Nanowires, with their large surface-to-volume ratio, are more susceptible to extrinsic perturbations that affect coupling strength, although literature assumes that coupling is intrinsic. This work uses Raman spectroscopy under a near resonant condition to probe the coupling strength of individual ZnTe nanowires. Using the intensity ratio of the first and second order Raman peaks, R $= I_{2LO}/I_{1LO}$, as a measure of the electron-phonon coupling strength (proportional to the Huang-Rhys factor), we find that the ratio can change greatly when varying either the sample or measurement condition, for instance, the presence of defects in the as-grown sample and their removal though laser illumination.

Jason Marmon
Nanoscale Science Program, UNC-Charlotte

Date submitted: 13 Nov 2014 Electronic form version 1.4