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Photoluminescence of Highly Strained GaAs/GaP Core-Shell Nanowires[1] M.A. FICKENSCHER, M. MONTAZERI, L.M. SMITH, H.E. JACKSON, University of Cincinnati, J.M. YARRISON-RICE, Miami University, J.H. KANG, Q. GAO, H.H. TAN, C. JAGADISH, Australian National University, Y. GUO, J. ZOU, University of Queensland, M.E. PISTOL, Lund University, C.E. PRYOR, University of Iowa — We present low temperature photoluminescence (PL) and time-resolved PL spectra from highly strained GaAs/GaP core-shell nanowires (NWs). Theoretical modeling predicts that the band structure of the NWs can be tuned by changing the ratio of the core radius to total NW radius. For this study, the ratio was changed by altering either the thickness of the GaP shell or the GaAs core radius with the other held fixed. Cross-sectional TEM is used to measure the range of core and shell radii. The PL from both methods confirms that the band gap can be shifted to dramatically higher energies from the 1.515eV GaAs free exciton peak and is consistent with the theoretical predictions as well as direct Raman measurements of the strain.

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