

Abstract Submitted  
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**Photoluminescence Dynamics of GaAs/AlGaAs Core-Shell Nanowires**<sup>1</sup> H.J. JOYCE, Y. KIM, Q. GAO, H.H. TAN, C. JAGADISH, Australian National University, M.A. FICKENSCHER, S. PERERA, T.B. HOANG, H.E. JACKSON, L.M. SMITH, University of Cincinnati, J.M. YARRISON-RICE, Miami University, X. ZHANG, J. ZOU, University of Queensland — We use time-resolved PL spectroscopy to study the exciton dynamics of GaAs/AlGaAs core-shell nanowires (NWs) at 20 K. NWs were prepared by Au catalyst-assisted MOCVD. PL emission from single NWs exhibits an excitonic peak at  $\sim 1.515$  eV. The exciton lifetime depends on the morphology and crystallographic defect density of the GaAs core, which are in turn dependent upon the growth conditions. Nanowires cores grown at higher temperatures (450 °C) give short exciton lifetimes ( $< 100$  ps). Reducing defects within the nanowire (twinning) or at the interface should increase exciton lifetime and improve luminescence efficiency. Indeed, twin-free minimally tapered nanowires achieved using a low growth temperature (375 °C), exhibit high quantum efficiency with an exciton lifetime approaching 1.6 ns at 20 K.

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