

Abstract Submitted
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Temperature-dependent photoluminescence imaging of GaAs/AlGaAs heterostructure quantum well tubes¹ TENG SHI, HOWARD JACKSON, LEIGH SMITH, University of Cincinnati, JAN YARRISON-RICE, Miami University, NIAN JIANG, HOE TAN, QIANG GAO, CHENNUPATI JAGADISH, Australian National University — Two sets of GaAs/AlGaAs core-multi shell nanowire quantum well tubes (QWTs) grown by MOCVD, with QW widths of 2nm and 6nm are dispersed onto a 4mm diameter hemispherical solid immersion lens. We obtain high spatial resolution photoluminescence (PL) images of single nanowires (NWs) from 10 K up to 120 K. High spectral resolution PL spectra reveal several narrow emission lines on high energy side of the 2nm QWT at low temperatures. In the 6nm QW, such narrow emission lines are not observed. Spatially-resolved PL images show that these localized states are randomly distributed along the NW long axis. Temperature-dependent PL imaging indicates that the quantum dot emissions disappear at temperatures above 50K. The recombination lifetime for electrons and holes in the QWT for the 2nm and 6nm QWTs are 500ps and 800 ps, respectively. We observe the recombination lifetime increases slightly with increasing temperature.

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