

Abstract Submitted
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Temperature dependent photoluminescence from polymer nanocomposites of size-purified silicon quantum dots AUSTIN R. VANSICKLE, JOSEPH B. MILLER, NDSU, REBECCA J. ANTHONY, UWE R. KORTSHAGEN, University of Minnesota, ERIK K. HOBBIIE, NDSU — The photoluminescence (PL) of polydimethylsiloxane (PDMS) nanocomposites of size-purified silicon nanocrystals is measured as a function of temperature and nanoparticle size. The overall behavior is in agreement with the trends imposed by quantum confinement, where the temperature dependence of the nanocrystal bandgap is governed primarily by intrinsic electron-phonon coupling. The response of the PDMS nanocomposites provides a consistent measure of local temperature through intensity and lifetime in a polymer-dispersed morphology suitable for biomedical applications, and we exploit this to fabricate a small-footprint fiber-optic cryothermometer.

Erik K. Hobbie
NDSU

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