

Abstract Submitted
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Photocurrent spectroscopy of CdS nanosheets P. KUMAR, A. WADE, H.E. JACKSON, L.M. SMITH, University of Cincinnati, J. YARRISON RICE, Miami University, Y.-J. CHOI, J.-G. PARK, Korea Institute of Science and Technology, Seoul — We study the photocurrent from photoexcited charge carriers in CdS nanosheet (NS) structures. Metal-semiconductor-metal nanodevices are made with both Schottky and Ohmic contacts using photolithography followed by Ti/Al (20nm/200nm) metal evaporation and lift-off. Ohmic contacts are formed by Ar ion bombardment before the metal deposition to create donor sulfur vacancies which increases the electron concentration. Photocurrent spectra using a white light source filtered by a monochromator show excitonic resonances at low temperatures corresponding to each of the A, B, and C hole bands. The photocurrent increases linearly with power for above gap excitation, and nonlinearly (quadratic) with laser power for below gap excitation, consistent with two-photon absorption with a nonlinear coefficient of $\beta = 2$ cm/GW. A wavelength dependence of the photocurrent with sub-band gap excitation to find the resonances and hence band structure is in progress. We acknowledge the financial support of the National Science Foundation through grants DMR-0806700, 0806572 and ECCS-0701703, and the KIST institutional research program 2E21060R.

A. Wade
University of Cincinnati

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