Abstract Submitted
for the OSF16 Meeting of
The American Physical Society

Thickness-tunable synthesis of Two-dimensional PbS/CdS heterostructure. ZHOUFENG JIANG, Physics and Astronomy and Center for Photochemical Science, Bowling Green State University, SIMEEN KHAN, Physics and Astronomy, Bowling Green State University, SHASHINI PREMATHILKA, Physics and Astronomy and Center for Photochemical Science, Bowling Green State University, JIANJUN HU, ANDREY VOEVODIN, Air Force Research Laboratory, PAUL ROLAND, RANDY ELLINGSON, Physics and Astronomy, University of Toledo, LIANGFENG SUN, Physics and Astronomy and Center for Photochemical Science, Bowling Green State University, PHYSICS AND ASTRONOMY, UNIVERSITY OF TOLEDO TEAM — Emissive PbS/CdS core/shell nanosheets are synthesized using cation-exchange methods. A significant blue-shift of the photoluminescence is observed, indicating a stronger quantum confinement in the PbS core as its thickness is reduced to eight atomic layers. High resolution transmission-electron-microscopy images of the cross-sections of the core/shell nanosheets show atomically sharp interfaces between PbS and CdS. Accurate analysis of the thickness of each layer reveals the relationship between the energy-gap and the thickness in an extremely one-dimensionally confined nanostructure. Photoluminescence lifetime of the core/shell nanosheets is significantly longer than the core-only nanosheets, indicating better surface passivation which means a more significant potential for energy application.

Zhoufeng Jiang
Physics and Astronomy and Center for Photochemical Science, Bowling Green State University

Date submitted: 12 Sep 2016 Electronic form version 1.4