Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Synthesis and integration of TMDs into nonlinear optical devices ANA LAURA ELIAS, COREY JANISCH, ALEX COCKING, ZHONG LIN, ETHAN KHAN, NESTOR PEREA-LOPEZ, The Pennsylvania State University, PULICKEL M. AJAYAN, Rice University, MAURICIO TERRONES, The Pennsylvania State University, HUMBERTO TERRONES, Rensselaer Polytechnic Institute, ZHIWEN LIU, The Pennsylvania State University — 2-Dimensional atomic layers constitute and emerging platform for the development of novel multifunctional ultra-thin and transparent materials for novel photonic devices. In particular, several routes have been expored to achive the isolation of single and few layered semiconducting transition metal dichalcogenides (TMDs). Powder pyrolysis is suitable approach for the synthesis of monocrystalline 2D transition metal dichalcogenides (TMDs). We have used this method to grow 2D TMDs into various forms, including pristine MoS2, WS2, as well as their alloys and heterostructures. The properties and growth dynamics of 2D TMDs are greatly affected by the choice of substrate. By transferring the 2D layers into arbitrary substrates, interesting applications of semiconducting TMDs in novel photonic applications can be envisaged. Integration of such devices constitutes a step forward in the exploitation of semiconducting TMDs unique extremely large nonlinearity. We have demonstrated the enhanced absorption and photoluminescence generation from MoS2 monolayers coupled with planar nanocavities. Second Harmonic Generation (SHG) in monolayer WS2 will also be discussed.

Ana Laura Elias
The Pennsylvania State University

Date submitted: 11 Nov 2016 Electronic form version 1.4