Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Spanning graphene to carbon-nitride: A 2-D semiconductor alloy system of carbon and nitrogen JOEL THERRIEN, YANCEN LI, ECE, U. Mass Lowell, DANIEL SCHMIDT, Plastics Eng, U. Mass Lowell — With the explosion of materials that form 2-D structures in the past few years, there have been a much more diverse ecosystem of combinations of characteristics to explore. Yet with the majority of materials investigated, the properties are fixed according to the composition of the material. Ideally, one wishes to have a tunable system similar to the semiconductor alloy systems, such as $Al_xGa_{1-x}As$. There have been some theoretical studies of transition metal dichalogenides, none have been reported experimentally as of this writing. The tertianary alloy of BCN has been synthesized, however it was found that the boron had the tendency to cause phase segregation of the material into domains of graphene and boron nitride. Here we will report on the synthesis of non-phase seperated carbon-nitrogen 2D alloys ranging from graphene (E_g =0 eV) to carbon-nitride, or melon, (E_g =2.7 eV). We will report on synthesis methods and a summary of relevant electronic and material properties of selected alloys.

Joel Therrien
U. Mass Lowell

Date submitted: 14 Nov 2013 Electronic form version 1.4