Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Pristine graphene dispersions and solution-cast composites SRIYA DAS, FAHMIDA IRIN, AHMED WAJID, ABEL CORTINAS, MICAH GREEN, Department of Chemical Engineering, Texas Tech University — Graphene holds potential as strong, conductive fillers in polymer nanocomposites; however, difficulties in dispersion quality and interfacial strength between filler and matrix have been a persistent problem for graphene-based nanocomposites, particularly for pristine, unfunctionalized graphene. We utilize a triphenylene based molecule (C10) to stabilize pristine graphene in water with a high graphene/stabilizer ratio. C10 molecules pi-pi stack with the graphene surface and prevent reaggregation. This dispersion can be reversibly destabilized based on pH and is stable against heat and lyophilization. Solution cast poly (vinyl alcohol) (PVA) composites prepared from these dispersions have enhanced mechanical and electrical properties (percolation threshold: 0.26 vol % graphene). Also, for the first time, pristine graphene/PVA dispersions are electrospun to form graphene/polymer composite nanofibers.

Micah Green
Department of Chemical Engineering, Texas Tech University

Date submitted: 28 Nov 2011   Electronic form version 1.4