

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Structures and Elastic Moduli of Polymer Nanocomposite Thin Films HONGYI YUAN, ALAMGIR KARIM, The University of Akron, THE UNIVERSITY OF AKRON TEAM — Polymeric thin films generally possess unique mechanical and thermal properties due to confinement. In this study we investigated structures and elastic moduli of polymer nanocomposite thin films, which can potentially find wide applications in diverse areas such as in coating, permeation and separation. Conventional thermoplastics (PS, PMMA) and biopolymers (PLA, PCL) were chosen as polymer matrices. Various types of nanoparticles were used including nanoclay, fullerene and functionalized inorganic particles. Samples were prepared by solvent-mixing followed by spin-coating or flow-coating. Film structures were characterized using X-ray scattering and transmission electron microscopy. Elastic moduli were measured by strain-induced elastic buckling instability for mechanical measurements (SIEBIMM), and a strengthening effect was found in certain systems due to strong interaction between polymers and nanoparticles. The effects of polymer structure, nanoparticle addition and film thickness on elastic modulus will be discussed and compared with bulk materials.

Hongyi Yuan
The University of Akron

Date submitted: 15 Nov 2013

Electronic form version 1.4