

Abstract Submitted
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Elastic Moduli of Nanoparticle-Polymer Composite Thin Films via Buckling on Elastomeric Substrates HONGYI YUAN, ALAMGIR KARIM, Department of Polymer Engineering, The University of Akron, Akron, OH, USA, UNIVERSITY OF AKRON TEAM — Polymeric thin films find applications in diverse areas such as coatings, barriers and packaging. The dispersion of nanoparticles into the films was proven to be an effective method to generate tunable properties, particularly mechanical strength. However, there are very few methods for mechanical characterization of the composite thin films with high accuracy. In this study, nanometric polystyrene and polyvinyl alcohol films with uniformly dispersed cobalt and Cloisite nanoparticles at varying concentrations were synthesized via flow-coating and then transferred to crosslinked polydimethylsiloxane (PDMS) flexible substrates. The technique of Strain-Induced Elastic Buckling Instability for Mechanical Measurements (SIEBIMM) was employed to determine the elastic moduli of the films, which were calculated from the buckling patterns generated by applying compressive stresses. Results on moduli of films as a function of the concentrations of nanoparticles and the thicknesses of the composite films will be presented. *Corresponding author: alamgir@uakron.edu

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