

Abstract Submitted  
for the 4CF14 Meeting of  
The American Physical Society

**Bulge Testing for Mechanical Characterization of  $sp^2/sp^3$  Carbon Thin Films**<sup>1</sup> JOSEPH ROWLEY, Brigham Young University — Bulge testing is a technique employed to measure material properties of thin films. Pressurized gas is applied to one side of a film and its subsequent deformation measured. In many cases, thin films are fragile and therefore difficult to handle. Bulge testing has the advantage of requiring much less handling than other methods, resulting in fewer samples lost to error or accident. Carbon membranes have a wide range of characteristics, depending on their bonding and nano-structure. They can have very desirable properties such as: being chemically inert, high wear resistance and low friction, and high hardness and/or strength. In this work, reactively sputtered  $sp^2$  carbon, diamondlike carbon from a pulsed laser deposition process, and a carbon nanotube reinforced polymer were characterized. PEELS and Raman Spectroscopy were used to determine  $sp^3/sp^2$  ratios and density, CHN testing was used to determine hydrogen content, measuring the resonant frequency was a measure to check stiffness, and bulge testing was used to obtain the Young's Modulus and tensile strength.

<sup>1</sup>Supported by Moxtek, Inc. Orem, UT

Joseph Rowley  
Brigham Young University

Date submitted: 17 Sep 2014

Electronic form version 1.4