

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Frictional Properties of UV illuminated ZnO Thin Films Grown by Pulsed Laser Deposition**<sup>1</sup> HSIANG-CHIH CHIU, HUAN-PU CHANG, FANG-YU LO, YU-TING YEH, Department of Physics, National Taiwan Normal University, DEPARTMENT OF PHYSICS, NATIONAL TAIWAN NORMAL UNIVERSITY COLLABORATION — Zinc Oxide (ZnO) nanostructures have potential applications in nano-electro-mechanical systems (NEMS) due to their unique physical properties. ZnO is also an excellent lubricant and hence a promising candidate for protective coatings in NEMS. By means of atomic force microscopy (AFM), we have investigated the frictional properties of ZnO thin films prepared by pulsed laser deposition technique. In addition, UV illumination is used to convert the surface wettability of ZnO thin films from being more hydrophobic to superhydrophilic via the photo-catalyst effect. We found that the frictional properties of the UV illuminated, superhydrophilic ZnO surface are strongly dependent on the environment humidity. While for hydrophobic ZnO, no such dependence is found. The observed frictional behaviors can be explained by the interplay between the surface roughness, environmental humidity and the presence of nanoscale capillary condensation forming between surface asperities at the tip-ZnO contact. Our results might find applications in future ZnO related NEMS.

<sup>1</sup>Frictional Properties of UV illuminated ZnO Thin Films Grown by Pulsed Laser Deposition

Hsiang-Chih Chiu  
Department of Physics, National Taiwan Normal University

Date submitted: 05 Nov 2015

Electronic form version 1.4