MATERIALS ENGINEERING
SEMINAR

"Nanostructure Tunability in Vertically Aligned Nanocomposite Thin Film"

By Bethany Rutherford
Purdue MSE PhD Dissertation
Advisor: Professor Haiyan Wang

ABSTRACT

Nanocomposite thin films are materials that have the potential to improve and tune many properties for various applications in electronics, sensors, memory storage, and optics. Materials properties are a consequence of their structure, so being able to manipulate the nanostructure of nanocomposite thin films is important for modifying them for device purposes. One structure that has gained a lot of attention is vertically aligned nanocomposites (VANs) due to the increased vertical coupling between two or more phases of materials and the unique nanostructures achievable through controlling deposition factors.

VAN thin film growth involves many factors: diffusion, substrate surface conditions, source material composition, and deposition temperature and rate. The two main approaches to thin film fabrication are bottom-up and top-down. Bottom-up growth focuses on the self-assembly of the nanostructure. This work focuses on the self-assembly of VAN thin film materials through controlling the thermodynamic and kinetic factors involved in thin film growth. The main factors being considered in this work are substrate manipulation, oxygen gas flow during deposition, deposition rate, and composition. The effectiveness of each of these methods is evaluated in comparison to each other and their growth of VAN thin film materials along with the future work needed to refine each nanostructure manipulation method.

Date: Wednesday, July 20, 2022
Time: 9:00am
Location: ARMS 1021 or via WebEx https://purdue.webex.com/meet/hwang00

PURDUE UNIVERSITY
School of Materials Engineering