

Molecular Layer Deposition of Polyimide Thin Films

Proposal

This project proposes to develop a recipe for the deposition of polyimide films using atomic (ALD) and molecular layer deposition (MLD) resources within the SNF. The ability to deposit highly conformal, aligned, and pinhole-free polymers such as polyimides with digital thickness control at the molecular level can enable unique process capabilities and new applications within the SNF. Specifically, MLD of polyimides addresses many limitations of conventional spin-coating and thermal imidization by providing a repeatable process to achieve ultrathin, uniform, and high quality (thermally, chemically, and mechanically robust) polyimide films at the wafer-scale. Precursor chemistries for MLD of polyimides have been demonstrated and confirmed by several research groups [1-4].

Objective

- (1) Develop a standard recipe template for the deposition of polyimide in the MLD Savannah and characterize the baseline recipe growth parameters.

Timeline

This proposal is a continuation of an EE 412 project originally proposed in September 2014. Several months have been spent addressing hardware and software issues as well as debugging process challenges related to the use of low vapor pressure precursors common in the deposition of organic materials. The project is expected to be complete by June 2015.

Frequency of Review

Weekly status meetings are schedule with Dr. Michelle Rincon.

References

- [1] J. Mater. Chem., 17, 664–669 (2007)
- [2] Chem. Vap. Deposition, 15, 221–226 (2009)
- [3] Nanotechnology 22, 335302 (2011)
- [4] Appl. Phys. Lett. 59, 482 (1991)