

April 30th, 2021**Study of Flexible Gold Nanoparticle and Polystyrene Hybrid Films for Floating Gate Application****Katie Flint and Kathy Lu***Department of Materials Science and Engineering, Virginia Tech***Abstract**

Due to the advantageous properties of AuNPs as collective electron transport being dispersed in organic or dielectric material, they are subject of much interest in electrical field. The nanoparticles used in this study are of 2.2 nm in size and their concentrations are 2 wt%, 4 wt%, 6 wt%, 10wt%, and 15wt%. The AuNPs have been dispersed in 1wt% polystyrene due to the mechanical and dielectric properties of the polymer. TEM analysis has been done to observe the dispersion of AuNPs in the polymer matrix. The electrical properties like memory window, memory retention time have been considered for investigation, also the mechanical properties like flexibility of the films have been investigated. To test the electrical properties, the PS-AuNP solutions have been spin-coated onto conductive polyaniline thin films. The effect of different concentrations of Au NPs dispersed in the film has been analyzed to understand the variation in memory characteristics and flexibility of the films have been investigated for their potential application in flexible electronics. The devices are flexible which make them efficient for making flexible electronic devices. These properties and effects are key in developing memory window, memory retention time and flexibility in the organic thin film transistor devices.

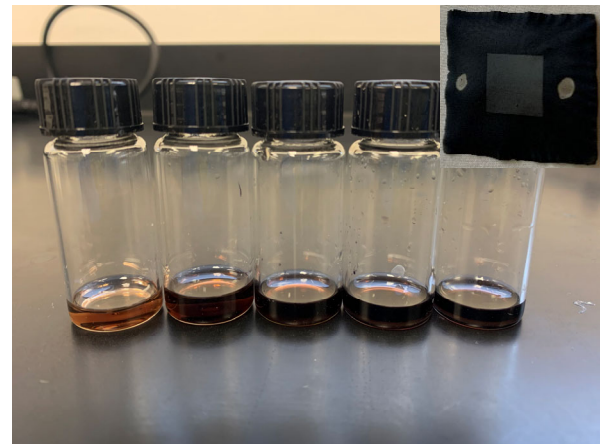


Figure 1: Concentrations of PS-AuNP solutions in the order of 2wt%, 4wt%, 6wt%, 10wt%, and 15wt% from left to right (main picture). Image of the prototype for the memory testing device (top right).

Biography

Katie Flint is a 2nd year Masters of Engineering student in Materials Science and Engineering and hoping to complete her degree in the Spring of 2021. After graduating from Virginia Tech with a B.S. in Nanoscience, she decided to further her career and began working with Dr. Kathy Lu once admitted to the MSE program. Her primary research focus is polymer nanocomposites.

