

Size-control and characterization of nanoGUMBOS

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Nanoparticles derived from a Group of Uniform Materials Based on Organic Salts (NanoGUMBOS) have unique and versatile properties derived from ionic liquids. These organic nanoparticles display enhanced and uniform properties at the nanoscale level. NanoGUMBOS, with melting points between 25°C and 250°C, are useful for various applications depending on the type of anion and cation used for formation. The performance and reliability of these applications are often size-dependent because the properties of nanoparticles often change with size and stacking arrangement due to electron confinement into small spaces. Therefore, my research has focused on controlling the size of nanoGUMBOS that are composed of imidazolium based organic salts. In this talk, I will discuss non-templated ultrasonication and microwave-based synthesis methods. Transmission electron microscopy (TEM), dynamic light scattering (DLS), and zeta potential measurements (ζ measurements) were used to study the size and stability of nanoparticles in aqueous medium. Spectrophotometric measurements were also useful for investigating structural effects related to decreases in size of nanoparticles. Furthermore, the behavior of nanoGUMBOS formation under microwave heating was explained by observing their dielectric properties. As result of this study, I was able to reduce the size of zero-dimensional particles derived from GUMBOS to nanoscale and understand their behavior by use of various characterization techniques.

Biography

Suzana Hamdan is a Ph.D. candidate in the area of analytical chemistry at Louisiana State University under the guidance of Professor Isiah Warner. She pursued her undergraduate studies in general chemistry at Lebanese University and graduated in 2006. She then joined East Tennessee State University where she completed her master's degree and defended a thesis on the analytical applications of immobilized enzymes in sol-gels. After graduation in 2009, she began her Ph.D. studies in analytical chemistry and her recent research interest is in the area of nanotechnology where she is studying nanoparticles produced from novel materials based on organic salts. She currently has several manuscripts under preparation which disclose her studies.

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