



UNIVERSITY OF SOUTH ALABAMA

Department of Chemistry Presents Seminar Series Speaker

Ashley Hotaling

*University of South Alabama
Mobile, Alabama*

Acoustic Levitation of Gold Nanoparticles in an Electromagnetic Field

This experiment was designed to see if ionic liquid compatibilized gold nanoparticles (AUNP) suspended in a levitating droplet will absorb electromagnetic (EM) radiation. The preliminary experiment was successful in determining an increased temperature change as a levitating droplet containing AUNPs was exposed to 13.5 MHz radiation and eventually evaporated. However, it was not certain that the temperature increase was due to the AuNPs absorbing EM radiation. Consequently, a method of synthesis for AUNPs was found in the literature by Thawarkar et. al in which the AuNPs were synthesized in the presence of an imidazolium ionic liquid. Unfortunately, a problem occurred with the original synthesis method. Even though it successfully produced IL-AUNPs, as confirmed with UV-Vis, it produced AUNPs that were present in both the organic and aqueous phase during solvent separation, instead of just the aqueous phase as reported in the literature.

As a result, a more precise way of measuring the EM radiation the particles may absorb was desired to cross-validate our previous experimental results. In this follow-up project, the synthesized IL-AUNPs were studied using an acoustic levitator, two Near Field Communication (NFC) antennae, and a SSA3000X Series Spectrum Analyzer to confirm our previous results. It was found in this study that the network analyzer does not show a change in EM signal absorbance when the AUNPs are floated in the presence of a magnetic field. The project is now focused on trying to figure why the network analyzer does not pick up the signal absorbed by the gold nanoparticles. One plausible theory is that the nanoparticles are not concentrated enough. This would mean that the nanoparticles might not absorb enough of the EM radiation for the network analyzer to detect a meaningful change. This is the source of current studies.

Friday, April 23, 2021, 12:20 pm

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