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The overall goal of the research project is to create a glass that produces cerium oxide nanoparticles and as an efficient delivery mechanism. Cerium is able to exist as Ce3+ and Ce4+ because it has two partially filled subshells. This coexistence allows cerium oxide to have antioxidant properties that reduce the number of free radicals in that body that are associated with cancer, diabetes, and neurodegenerative diseases. In our laboratory, using a soluble borate glass, cerium oxide nanoparticles are created to coexist in Ce3+ and Ce4+ valences This borate glass composition is doped with different amounts of Cerium(IV) Oxide and melted under different melting parameters to achieve different amounts of nanoparticles with Ce3+ and Ce4+ valences. The molted glass is poured on a steal plate and then powdered to achieve particle size <32micrometers. After obtaining glass powder, the glass is dissolved in DI water and centrifuged under 4000 rmp. The precipitate is washed in DI water and dried at 70^{o} C to extract the nanoparticles. The extracted nanoparticles are analyzed using high-resolution FEI Tecnai 30 TEM at Georgia Tech. The captured images of the extracted nanoparticles are observed using an ImageJ software to measure atomic distances and crystal sizes of these nanoparticles. for the TEM analysis confirms the release of Ce3+ which is necessary to have with Ce4+ for both to act as an antioxidant. This allows for thorough investigation of what effects different melting times, raw materials, and heat of melting has on the cerium oxide nanoparticles.