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Optical Analysis of the Plasmon Resonances of Gold Nano-Ring

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Abstract : The current research aims to explore a method for creating nano-ring structures through chemical reduction. By employing a direct reduction process at a controlled, slow pace, and concurrently introducing specific reduction agents, the goal is to fabricate these unique nano-ring formations. The deliberate slow reduction of nanoparticles within this process helps prevent spatial hindrances caused by the reduction agents. The timing of the reduction of metal atoms, facilitated by these agents, emerges as a crucial factor influencing the creation of nano-ring structures. In investigation involves a chemical approach utilizing bovine serum albumin and human serum albumin as organic reducing agents to produce gold nano-rings. The controlled reduction of metal atoms at a slow pace and under specific pH conditions plays a pivotal role in the successful fabrication of these nanostructures. Optical spectroscopic analyses revealed distinctive plasmonic behavior in both visible and infrared spectra, owing to the collective movement of electrons along the inner and outer walls of the gold nano-rings. Importantly, these ring-shaped nanoparticles exhibit customizable plasmon resonances in the near-infrared spectrum, a characteristic absent in solid particles of similar sizes. This unique attribute makes the generated samples valuable for applications in Nanomedicine and Nanobiotechnology, leveraging the distinct optical properties of these nanostructures.

Keywords : nano-ring structure, nano-particles, reductant agents, plasmon resonace
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