Abstract Submitted
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Laser Deposition of Noble Metal Nanoparticles[1] NICHOLAS JENKINS, ANATOLIY PINCHUK, Univ Colorado - Colorado Springs — The mechanism behind a novel technique in which lasers can be used as a pen that can write lines made of metals, such as silver or gold on a substrate is investigated through analytical and numerical methods. The substrate can be glass, plastic, or other suitable materials. These laser deposited metal nanostructures, which exhibit plasmonic behavior, can be used to substantially enhance inelastic scattering of light that can detect small amounts of chemicals and biologically relevant microorganisms. To fabricate plasmonic substrates that can enhance scattered light with the highest efficiency we need to understand the exact physical-chemical mechanism involved. The deposition consists of dropping a solution of silver nitrate on a glass slide and tracing a focused laser across the glass surface. Laser-induced deposition is most likely initiated by the photo reduction of silver ions to silver nanoparticles. Then, particle-surface interactions drive the nanoparticles to the substrate leading to a permanent attachment. To examine the large scale behavior of the depositing nanoparticles, a numerical method known as extended random sequential adsorption (XRSA) was utilized. From the results obtained through XRSA a clearer picture of the laser-induced deposition is developed.

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