

# Synthesis of gold nanorods and bulk refractive index sensing using sucrose

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## **Abstract**

Localized surface Plasmon resonance (LSPR) is observed in metal nanoparticles with dimensions smaller than the wavelength of incident light. The LSPR depends upon the size, shape, dielectric properties of nanoparticles, and the dielectric properties of the surrounding environment to the metal nanoparticles. Because of their unique optical properties, gold nanorods have been used extensively in the field of biosensors. Extensive work has been in progress for the past few decades on the synthesis and applications of gold nanorods. Among various available methods, seed-mediated synthesis is considered the most useful and promising method. In this work, we present the synthesis of nanorods of different aspect ratios, along with their refractive index sensing capabilities. The longitudinal peak positions and hence, the aspect ratio of Au nanorods were tuned by varying the concentrations of silver nitrate. Bulk refractive index sensitivity measurements of nanorods reveal maximum RI sensitivity of 253nm/RIU for nanorods of the longitudinal peak at 778.7 nm. The gold nanorods with maximum refractive index sensitivity can be used for surface-functionalization and biomolecular sensing.