

Abstract Submitted
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Dynamic control over nanoparticle plasmon resonance through variation of refractive index¹ HARI P. PAUDEL, MICHAEL N. LEUENBERGER, University of Central Florida — In a semiconductor material it is possible to vary the index of refraction by exciting electron-hole pairs through a laser pulse. Generally the change in refractive index changes linearly with the carrier density and also increases with the lattice temperature. We present our results on the variation in index of refraction in the TiO₂ shell of an Ag/TiO₂ core-shell nanoparticle by exciting electron-hole pairs in TiO₂ through a laser pulse. We performed bandstructure calculations using VASP to determine the variation of the optical dielectric tensor as a function of photon frequency. This change in refractive index not only affects the refraction of photons with frequency below bandgap, but also affects strongly the resonance peaks of the surface plasmons due to the Ag core. This effect can be used to dynamically control the plasmon resonance of a hybrid metal-semiconductor nanoparticle, for example for use in cancer therapy or nanoplasmonic circuits.

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