RESONANCE ABSORPTION ON SLOW-PLASMON NANOSTRIPS

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In nano-optics, one of the research directions is the search for configurations that strongly localized optical fields and efficiently interconvert propagating, which are very important to optical characterization, sensing and manipulation at nanoscale [1]. A very recent interpretation is that the resonances occurring on these resonant structures is an effect of constructive interference between counter propagating slow surface plasmon polaritons (SPPs) which are bounded to and propagating along either nanometer-thin metal wires [2] and strips [3] or in nanometer-thin gaps between metal surfaces [4].

In this paper, we discuss the resonant phenomenon and resonant conditions of slow-plasmon resonant nanostrips. Computer simulation results trough finite element methods (FEM) are shown to analyses the relationship between different parameters.

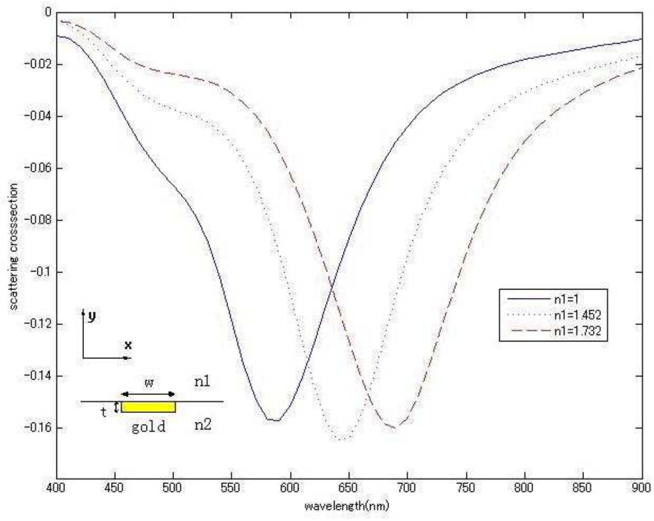

Fig.1. Scattering spectra with different n_1.

We consider a gold nanostrip inlaid on the surface of dielectric substrates, which has a refractive index as n_2. The refractive index of free space environment is n_1. Figure 1 shows that, when n_1 changes from 1 to 1.732, the resonant wavelength of a gold nanostrip will be shifted from 580nm to 690nm. The resonant condition can be concluded as:

$$w\frac{2\pi}{\lambda}(n_{slow1}+n_{slow2}) = m\pi+\phi \qquad (1)$$

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