Faculty of Engineering
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Research on plasmonic nanophotonic devices

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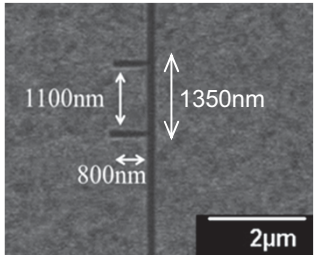


(a) SEM image

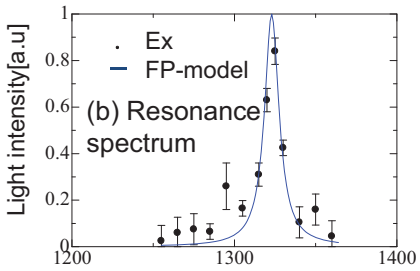


Fig. 1 Resonator in SPP waveguide

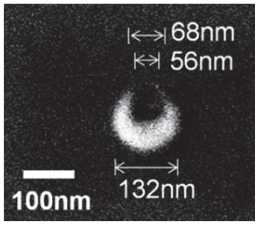
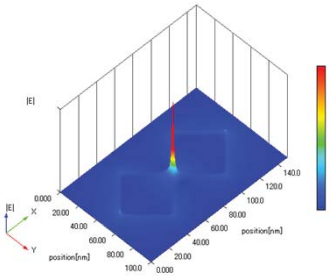


Fig. 2 Sprit ring resonator

Microscopic measurement system



Numerical light intensity distribution of metal nano dimer

Electron beam drawing system

Content:

Surface plasmon polaritons (SPPs) exist on a metal-dielectric interface. SPPs will provide the spatial field enhancement and the field localization beyond the diffraction limit at the interface. A lot of researchers is working on ultra-compact optical devices and/or high sensitive sensors by using characteristics of SPPs. The engineering based on SPPs is often called “Plasmonics.”

We are working on researches of plasmonic waveguides, which provides narrow width of the deep sub wavelength, and the related devices, eg ultra-compact optical resonators, sensors and SPP sources. Figure 1 shows an example of resonators built in a plasmonic waveguide with Q factor = 100 and an area size of = 2 μm. We also shows a scanning electron microscopy image of a sprit ring resonator with a diameter of 132 nm, providing a optical resonance in near infrared region.

Final goals of our researches are establish of a plasmon-electron hybrid integrated circuits for optical communication information processing with high energy efficiency and drastic compact size and a compact sensor with ultra high sensitivity, eg, single molecule detection, for various application.

Keywords : Plasmonics, Nanophotonics

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