30

Si photonic crystal resonators

- Trapping light by artificial nano hole clusters in a thin Si film -

Motivation

Optical resonator is key element for various optical devices (lasers, switches, memories, filters, and so on.) A very compact optical resonator with high quality factor (*Q*) will make it true ultra-compact and ultra-efficient optical devices.

Originality

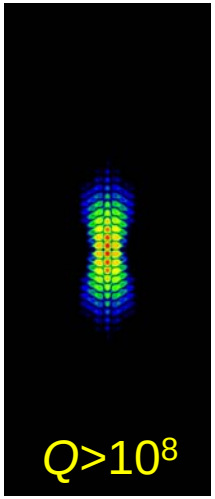
Recently, it was found that a periodic nano-scale air-hole array (Photonic Crystal: PC) fabricated in a thin Si film could trap light efficiently. Our original design realized 1.1ns trapping of light (*Q*~1.3 million) in wavelength-scale ultra-small volume.

Impact

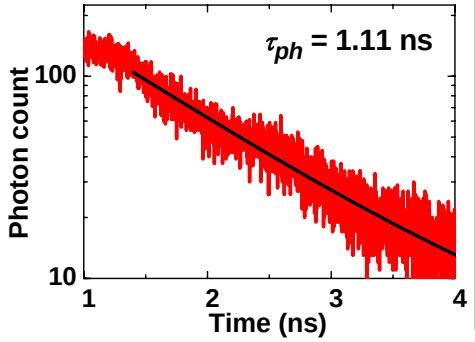
PC resonator is the only one solution that can achieve *Q* over one million with wavelength scale volume. Ultra-small integrated optical circuits with ultra-low energy consumption will be realized by the use of the ultrahigh-*Q* PC resonators. A Si PC resonator is highly compatible with other Si nanophotonics devices.

Contact person: Dr. Eiichi Kuramochi
Optical Science Laboratory, NTT Basic Research Laboratories
TEL: 046-240-3224 FAX: 046-240-4305
e-mail: kuramoti@nttbrl.jp

Electromagnetic field profile by 3D-FDTD



Time decay measurement



Electron microscope images of samples