Requests for Collaboration

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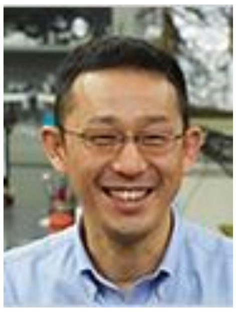

Research Interests

- Terahertz Optics
- Terahertz Spectroscopy Techniques
- Terahertz Spectroscopy and Applications

Creative Achievements in The Application of New and Existing Science and Technology

(1) A double-layered free-standing wire-grid polarizer (W-WG) at terahertz (THz) frequencies was fabricated. The measured extinction ratio of W-WG was estimated to be less than 10^{-6}, which is much smaller than that calculated with the Fabry-Perot model using the transmittance of a single-layered WG.
(2) We investigated the dip structure of metal mesh devices (MMDs) around extraordinary transmission region. We found that the origin of dip structure of MMDs was originated from localized spoof-surface plasmon polaritons which formed symmetric, quadrupole fields around the holes. These results are proposed that we use MMDs as a biosensor and particulate sensor.
(3) We achieved cavity-enhanced terahertz radiation from InAs in an internal ring cavity synchronized with 1-GHz-repetition rate femtosecond Ti:sapphire laser. We found that maximum enhancement factor of the ring cavity was 23.8 at 0.293 THz.

Technology (Product, Process, Device, Service etc.) That I Want to Request for Collaboration

- Terahertz quasi-optical devices
- Electromagnetic analysis by Finite-difference time-domain method (FDTD method) on a computer
- Terahertz spectroscopy and sensing

A List of 5 Key Publications

- Enhanced terahertz radiation from InAs in internal ring cavity, Y. Mitsuyama, Y. Muraoka, K. Nakagawa, S. Nashima, Y. Takida, and H. Kumagai, ***J. Jpn. Soc. Inf. Sci. Tech.*, 28,** 83-90 (2018).
- Selection of a Single Isotope of Multiply Charged Xenon ($^{A}Xe^{z+}$, A=128-136, z=1-6) by Using a Bradbury-Nielsen Ion Gate, A. Kitashoji, T. Yoshikawa, A. Fujihara, T. Kamamori, S. Nashima, T. Yatsuhashi, ***ChemPhysChem*, 18,** 2007-2011 (2017).
- Metal Mesh Device Sensor Immobilized with a Trimethoxysilane-Containing Glycopolymer for Label-Free Detection of Proteins and Bacteria, H. Seto, S. Kamba, T. Kondo, M. Hasegawa, S. Nashima, Y. Ehara, Y. Ogawa, Y. Hoshino, Y. Yoshiko, ***ACS Appl. Mat. Inter.***, **6,** 13234-13241 (2014).
- Coherent time-domain detection of terahertz pulses generated from noncollinear phase-matched, picosecond terahertz parametric oscillator, Y. Tadokoro, Y. Takida, H. Kumagai, S. Nashima, M. Hangyo, ***Appl. Phys. Exp*,**. 7, 022701(1)-(4) (2014).
- Growth of ultrathin and highly efficient organic nonlinear optical crystal 4'-dimethylamino-N-methyl-4-stilbazolium p-chlorobenzenesulfonate for enhanced terahertz efficiency at higher frequencies, S. Brahadeeswaran,, Y. Takahashi, M. Yoshimura, M. Tani, S. Okada, S. Nashima, Y. Mori, M. Hangyo, H. Ito, and T. Sasaki, ***Cryst Growth Des.*, 13**, 415-421 (2013).