

PROCEEDINGS OF SPIE

# ***Plasmonics: Design, Materials, Fabrication, Characterization, and Applications XVI***

**Din Ping Tsai  
Takuo Tanaka**  
*Editors*

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## Introduction

This proceedings volume contains the papers presented at the 2018 SPIE Optics + Photonics conference on Plasmonics: Design, Materials, Fabrication, Characterization, and Applications XVI held in San Diego, California, 19-23 August 2018. The aim of the conference was to bring together specialists from diverse research areas and to provide a forum for the exchange of information on the latest progress of the plasmonics.

The conference was divided into 18 sessions, covering a variety of topics related to the plasmonics. In the first session, presentations were related to novel materials for plasmonics, such as ultra-thin transition metal nitrides for tailorable plasmonic devices; metamaterial infrared absorber with nanofluidic channel for ultrasensitive molecular detection; tunable plasmon-induced resonance energy transfer and plasmon-exciton coupling in single plasmonic nanoparticles on two-dimensional transition metal dichalcogenides; plasmon-assisted cooperative energy transfer controls spontaneous emission rate beyond field enhancement limits; and plasmons at the interface for physics and medicine.

The second session was related to characterization for plasmonics, including the solar cell based on metamaterial perfect absorber; and novel nanospectroscopic technique through tip-enhanced Raman spectroscopy.

The third session dealt with plasmonic applications: revisiting quantum optics with single plasmons; quantum hydrodynamics for nanoplasmonics; and quantum effects in nanogap plasmonic systems.

The fourth session was quantum plasmonics, including plasmon-enhanced multi-functions; and the role of dielectric microlenses.

The fifth session was on plasmonic applications as well, such as microbubble nucleation and subsequent flow generation studied by thermoplasmonic effect; conversion and inversion of plasmonic angular momenta in nano-space; broadband enhancement of quantum dot emission for microLED using UV plasmonic nanoparticles; and plasmonic resonator devices for integrated application.

The sixth session's topic was metasurface, including broadband achromatic and high efficient metadevices via aluminum integrated resonant unit of metasurfaces; broadband plasmonic detour phase meta-holograms with full parameter control of light; high efficiency full-color router based on GaN metalens; and plasmonic coupled modes in metal-insulator-metal structures for sensing application.

The seventh session was devoted to fundamental of plasmonics, including nanophotonic structures for highly efficient on-chip optical manipulation;

observation of pure magnetism at optical frequencies in a plasmonic system; generation of convergent light spot by surface plasmon manipulated Smith-Purcell radiation on Yagi-Uda nanoantenna arrays; and avoided resonance crossing and asymmetric nearly perfect absorption in plasmonic nanodisks with near-field and far-field couplings.

The eighth session was related to nonlinear, including manifestations of photon acceleration in semiconductor metasurfaces; hybrid plasmonic-dielectric metamaterials for enhanced nonlinear response; and nano-optics of single plasmonic particle-on-film nanocavities.

The ninth session was also about plasmonic sensing: the enhancement of biomolecular detecting in Bloch surface wave sensor; and fluorescence of Pt nanoclusters for bio-imaging.

The tenth session was radiation engineering: exciton-plasmon interaction in two-dimensional semiconductors for refined light emission; a virus assembly experimental approach to the plasmonic Dicke effect; all-round fluorescence enhancements using Ag-Si hybrid stack nanoantennas; configurable strong coupling within plasmonic junctions; and deconvolving excitons and free carriers using plasmonic emission enhancement effect.

The eleventh session was active control. We had papers presented on ultra-low-loss polaritons in hexagonal boron nitride; active control of plasmonic enhanced light emission: tunable spontaneous emission and new plasmonic lasers; plasmonic vanadium dioxide microbolometers with wavelength and polarisation sensitivity; graphene-based plasmon modulator on silicon; and dynamic polarization control with optical metasurfaces.

The twelfth session was fundamental of plasmonics as well, which included excited-state and correlated light-matter interactions; a Van Hove singularity in the topology critical point of bilayer hyperbolic metamaterials; and towards the observation of exceptional points (EPs) in passive plasmonic nanostructures.

The thirteenth session was chiral plasmonics: nanoscale chiral valley-photon interface; peptide encoded gigantic chirality evolution in three-dimensional plasmonic helicoids; disordered photonic metasurfaces for complex light field control; and enhancing chiral fields with arrays of achiral particles.

The fourteenth session was plasmonic applications as well: thermal radiation studies of plasmonic materials and single antennas; additive nanomanufacturing of metallic nanostructures through a kick-and-place approach; and plasmonic angular momentum and its dynamical interactions with electrons.

The fifteenth session was also related to plasmonic applications, including nanoscale imaging of optical field by electron microscopy; super-resolution

mapping of the local density of states with single-molecule and fluorescence lifetime imaging microscopy; and direct measurement of optical losses in plasmon-enhanced thin silicon films.

The sixteenth session was devoted to plasmonic sensing as well, such as tunable plasmonic Moiré chiral metamaterials: cost-effective fabrication; and ultrasensitive SERS using plasmonic width-graded nanogratings.

The seventeenth session was also focused on nonlinear. We had papers presented on collective nonlinear optical effects in plasmonic oligomers using cylindrical vector beams; nonlinear graphene metasurfaces with advanced electromagnetic functionalities; and opto-acoustic interactions in lossy metal-dielectric waveguides.

The eighteenth session was also related to plasmonic applications, including plasmonic approaches for visualizing and controlling intercalation-driven phase transformations; second harmonic generation dynamic in plasmonic nanoparticles; absorption enhancement of dielectric metasurfaces with the Kerker effect; and large-scale chiral nanostructures fabricated using high-throughput nanofabrication methods.

**Din Ping Tsai**  
**Takuo Tanaka**

