한림대학교

제 55회
ORGAN ON A CHIP 기술교류회

2020.04.23 목 오후 4시 30분

한림대학교 Smart Campus 온라인 강연

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1. Education

박사: Univ. of Michigan, Biomedical Engineering (2005)
석사: 서울대학교, 재료공학 (2001)
학사: 연세대학교, 재료공학 (1999)

2. Experience

2015 ~ 현재	성균관대학교, 교수
2008 ~ 2015	Nayang Tech. Univ., 정년보장 부교수
2005 ~ 2008	Duke Univ., Research Associate
2005 ~ 2005	Univ. of Michigan, Post-Doc

제목

광학소재의 응용

Nanoscale Applications of Optical Materials

초록

Current advances and the challenges that lie ahead in developing optical materials for healthcare and biotechnology will be discussed. These advances include using plasmonic nanoparticles in biomolecular assay to probe dynamic behavior of various biomolecules. One of examples is plasmonic biosensors that has enabled LSPR-shift assay with single nanoparticles. Single-nanoparticle plasmonic sensors are particularly attractive because of better signal-to-noise resolution and low limits of detection. This promising probing tool on biomolecular assay should find their application in parallel screening of nucleic acid and protein profiles and will compete with current microarrays. Most recent development on a plasmonic dimer that utilizes plasmonic coupling will be also discussed.

Further, upconversion materials, Lanthanide trivalent ions (Ln3+) embedded in an inorganic host solid, which possesses the fascinating ability to convert multiple low-energy photons into a higher-energy photon will be discussed. Upconversion luminescence suggests the promise of Ln3+-doped materials in emerging novel applications, such as energy harvesting for solar cells or deep tissue optogenetics. The upconversion efficiency and the spectral purity are determined by the complex interaction between the host material and the lanthanide ion at an atomic level. However, the weak interaction inherited in the conventional host materials has been an obstacle of further improvements. In this regard, the novel host material that does not have a short-range order (1st coordination order) so as to maximize the host interactions will be discussed. This new material will be used in future laser technologies on photonic integrated circuit devices.

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