Plasmon-enhanced fluorescence spectroscopy

Por: Li, JF (Li, Jian-Feng)[1] ; Li, CY (Li, Chao-Yu)[1] ; Aroca, RF (Aroca, Ricardo F.)[2,3]
Ver ResearcherID y ORCID

CHEMICAL SOCIETY REVIEWS
Volumen: 46
Número: 13
Páginas: 3962-3979
DOI: 10.1039/c7cs00169j
Fecha de publicación: JUL 7 2017
Tipo de documento: Review
Ver impacto de la revista

Resumen

Fluorescence spectroscopy with strong emitters is a remarkable tool with ultra-high sensitivity for detection and imaging down to the single-molecule level. Plasmon-enhanced fluorescence (PEF) not only offers enhanced emissions and decreased lifetimes, but also allows an expansion of the field of fluorescence by incorporating weak quantum emitters, avoiding photobleaching and providing the opportunity of imaging with resolutions significantly better than the diffraction limit. It also opens the window to a new class of photostable probes by combining metal nanostructures and quantum emitters. In particular, the shell isolated nanostructure-enhanced fluorescence, an innovative new mode for plasmon-enhanced surface analysis, is included. These new developments are based on the coupling of the fluorophores in their excited states with localized surface plasmons in nanoparticles, where local field enhancement leads to improved brightness of molecular emission and higher detection sensitivity. Here, we review the recent progress in PEF with an emphasis on the mechanism of plasmon enhancement, substrate preparation, and some advanced applications, including an outlook on PEF with high time- and spatially resolved properties.

Palabras clave

KeyWords Plus: SINGLE-MOLECULE FLUORESCENCE; SILVER-ISLAND FILMS; SHELL-ISOLATED NANOPARTICLES; RAMAN-SPECTROSCOPY; GOLD NANORODS; SPONTANEOUS EMISSION; ROOM-TEMPERATURE; ENERGY-TRANSFER; DISTANCE DEPENDENCE; METAL NANOPARTICLES

Información del autor

Dirección para petición de copias: Li, JF (autor para petición de copias)

+ Xiamen Univ, Res Inst Biomimet & Soft Matter, Dept Phys,MOE Key Lab Spectrochem Anal & Instrume, Co Engn,iChEM,State Key Lab Phys Ch, Xiamen 361005, Peoples R China.

Dirección para petición de copias: Aroca, RF (autor para petición de copias)

+ Univ Windsor, Dept Chem & Biochem, Windsor, ON N9B 3P4, Canada.

Dirección para petición de copias: Aroca, RF (autor para petición de copias)

+ Univ Chile, Fac Sci, Dept Chem, Santiago, Chile.

Direcciones:

+ [1] Xiamen Univ, Res Inst Biomimet & Soft Matter, Dept Phys,MOE Key Lab Spectrochem Anal & Instrume Chem Engn,iChEM,State Key Lab Phys Ch, Xiamen 361005, Peoples R China

+ [2] Univ Windsor, Dept Chem & Biochem, Windsor, ON N9B 3P4, Canada

+ [3] Univ Chile, Fac Sci, Dept Chem, Santiago, Chile

Direcciones de correo electrónico: Li@xmu.edu.cn; arocarf@gmail.com

Financiación

Entidad financiadora	Número de concesión
NSFC	21522508 21427813 21521004
"111" Project	B16029 B17027
Fundamental Research Funds for the Central Universities	20720150039
Thousand Youth Talents Plan of China	

Ver texto de financiación

Editorial

ROYAL SOC CHEMISTRY, THOMAS GRAHAM HOUSE, SCIENCE PARK, MILTON RD, CAMBRIDGE CB4 0WF, CAMBS, ENGLAND

Información de la revista

- **Impact Factor:** Journal Citation Reports

Categorías / Clasificación

Áreas de investigación: Chemistry

Categorías de Web of Science: Chemistry, Multidisciplinary