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| Autore | Fritzsche Wolfgang |
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| Nota di contenuto | Molecular Plasmonics; Contents; Foreword; Chapter 1 Introduction; References; Chapter 2 Plasmonic Effects; 2.1 Electrical Conductivity in Metal; 2.1.1 Drude Model; 2.1.2 Drude-Lorentz Model; 2.1.3 Drude-Sommerfeld Model; 2.2 Optical Properties and Dielectric Constant; 2.3 Plasmons; 2.4 Volume Plasmons; 2.5 Surface Plasmons and Applications in Life Sciences; 2.5.1 Surface Plasmons in a Flat Metallic Film; 2.5.2 Biosensor Applications; 2.6 Localized Surface Plasmon; 2.6.1 LSP in Spherical Nanoparticles; 2.6.2 LSP in Nanorods; 2.6.3 LSP in Other Shapes; 2.6.4 Influence of Environment on LSPR; 2.6.5 Effects of Other Parameters on Resonance; 2.6.5.1 Composition; 2.6.5.2 Charge; 2.6.5.3 Neighboring Particles; 2.6.6 Field Enhancement, Damping, Dephasing Time, Line Width; 2.7 Combination of SPR and LSPR Approaches; 2.8 Nanoholes; 2.8.1 Nanoholes in Plasmonically Active Metal Films; 2.8.1.1 Arrays; 2.8.1.2 Single Holes; 2.8.2 Nanoholes in Other Materials; 2.9 Enhanced Spectroscopies; 2.9.1 Metal Enhanced Fluorescence; 2.9.2 Enhanced Raman Scattering; 2.9.2.1 Raman Spectroscopy; 2.9.2.2 SERS; 2.9.2.3 TERS; 2.9.2.4 SEIRA; References; Chapter 3 Nanofabrication of Metal Structures |

3.1 Introduction 3.2 Nanofabrication: Top-Down; 3.2.1 Lithography; 3.2.1.1 Thin Film Technology and Adhesion Layer; 3.2.1.2 Optical Lithography; 3.2.1.3 Electron Beam Lithography (EBL); 3.2.1.4 Focused Ion Beam (FIB); 3.2.2 Modern Nanofabrication Techniques; 3.2.2.1 Scanning Probe Techniques (STM, AFM, SNOM, Dip pen); 3.2.2.2 Soft Lithography; 3.2.2.3 Nanoimprinting; 3.2.2.4 Nanostructure Lithography; 3.2.2.5 Release of Surface-Bound Nanostructures into Solution; 3.3 Bottom-Up Approaches; 3.3.1 Physical: Gas-Phase Based Growth (Aerosol Process); 3.3.1.1 Mechanism of Particle Formation 3.3.1.2 Evaporation/Condensation and Island Film Preparation 3.3.1.3 Laser Ablation; 3.3.2 Chemical: Condensed-Phase Fabrication; 3.3.2.1 Introduction; 3.3.2.2 Mechanism of Particle Generation; 3.3.2.3 Stability of Small Metal Clusters; 3.3.2.4 Stabilization; 3.3.2.5 Single-Phase Synthetic Approaches; 3.3.2.6 Two-Phase Synthesis; 3.3.2.7 Synthesis in Confined Microenvironments; 3.3.2.8 Size Control by Synthesis; 3.3.2.9 Layered and/or Mixed Composition; 3.3.2.10 Shape Control: Anisotropic Structures; 3.3.2.11 Shape Control: Hard and Soft Templating 3.3.2.12 Enzyme-Mediated Nanoparticle Formation and Growth 3.3.2.13 Biosynthesis; 3.3.2.14 Chemical: Solid-Phase Fabrication; 3.4 Post-Processing, Combination, and Integration; 3.4.1 Increased Monodispersity by Wet-Chemical Post-treatment; 3.4.2 Radiation-Based Post-Processing for Size Tailoring; 3.4.3 Multifunctional Particles; 3.4.4 Integration; References; Chapter 4 The Molecular World; 4.1 Interaction and Forces between Molecules and Substrates; 4.2 Self-assembly Monolayer (SAM); 4.3 DNA; 4.3.1 DNA-Attachment to Plasmonic Nanoparticles; 4.3.2 Defined Stoichiometry DNA-Nanoparticle 4.4 Peptides and Proteins

Sommario/riassunto

Adopting a novel approach, this book provides a unique "molecular perspective" on plasmonics, concisely presenting the fundamentals and applications in a way suitable for beginners entering this hot field as well as for experienced researchers and practitioners. It begins by introducing readers to the optical effects that occur at the nanoscale and particularly their modification in the presence of biomolecules, followed by a concise yet thorough overview of the different methods for the actual fabrication of nano-optical materials. Further chapters address the relevant nano-optics, as well a
