

# Preface

The goal of this brief is to give a summary of recent advances in novel optical nanoprobe for chemical and biological analysis. The design and application of novel optical nanoprobe for chemical and biological analysis has become a new, growing area of interest in recent years. Taking advantage of the development of nanotechnology, various kinds of nanomaterials with novel optical properties have been generated, laying the foundation of optical nanoprobe. By further integrating receptors (chemical ligand, aptamer, molecular imprinting polymer, etc.), the chemical information of binding specific targets will transform into analytically useful optical variation signals. These sensors are attractive owing to their high sensitivity, high specificity, and potential for easy quantification of species in many fields of application, such as conventional chemical and biological analysis, clinical diagnosis, and intracellular system sensing, or even single molecule detection for their nanoscale size. In this brief, we will give an introduction to several kinds of talented nanomaterials such as gold/silver nanoparticles, quantum dots, upconversion nanoparticles, and graphene. Furthermore, we mainly focus on the most recent reported strategies to design sensors that apply the optical principles of nanomaterials to detect targets employing using various detection techniques including colorimetry, fluorometry, surface-enhanced Raman scattering (SERS). The challenges and future perspectives of optical nanoprobe will also be presented, such as increasing sensing performance for real environmental and clinical samples, the design and application of multifunctional nanoplatforms, and biocompatibility research.

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