Special Issue

Advancements in Metasurface-Based Optical and Optoelectronic Sensors

Message from the Guest Editors

Optical sensors represent a powerful class of label-free detection platforms capable of monitoring chemical, physical, and biological interactions as well as compositional changes. These devices operate by acquiring optical or optoelectronic signals, enabling real-time, high-sensitivity measurements without the need for fluorescent or radioactive labeling. The underlying mechanism relies on detecting variations in light properties. Recent advancements in **metasurfaces** and **nanomaterials** have significantly enhanced the performance of optical sensors. Metasurfaces, with their engineered subwavelength structures, and nanomaterials, such as plasmonic nanoparticles, quantum dots, and 2D materials, can generate strong optical resonances and narrow spectral responses. These features improve sensitivity, selectivity, and signal-to-noise ratios, enabling detection at ultra-low concentrations (down to single-molecule levels). The integration of these advanced materials has expanded the applications of optical sensors across diverse fields, including:

- **Environmental and chemical detection**
- **Biomedical diagnostics**
- **Spectroscopy and imaging**
- **Industrial and security applications**

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Message from the Editor-in-Chief

Sensors is a leading journal devoted to fast publication of the latest achievements of technological developments and scientific research in the huge area of physical, chemical and biochemical sensors, including remote sensing and sensor networks. Both experimental and theoretical papers are published, including all aspects of sensor design, technology, proof of concept and application. Sensors organizes Special Issues devoted to specific sensing areas and applications each year.

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