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EDITORIAL

Plasmonics—A Vision for the Future

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Plasmonics is quickly becoming a dominant technology for the twenty-first century. The classic text by H. Raether appeared in 1988, but the potential of surface plasmons laid dormant for a decade. It is now recognized that surface plasmons, which can be present on particulate, smooth, or corrugated metallic surfaces, have enormous potential in the fields of optical computing, novel optical devices, and— more recently—biological and medical research. These emerging applications are the result of the unique properties of surface plasmons, which are confined in a two-dimensional surface and can have dimensions considerably smaller than optical wavelengths. Surface plasmons can be, to a reasonable extent, controlled in two dimensions, trapping and transporting optical energy in nanoscale structures. At first glance this possibility seems similar to optical wavelengths. However, typical optical waveguides, in contrast to plasmonics devices, must be three-dimensional and have wavelength-size features. Additionally, the two-dimensional nature of plasmonic structures makes them compatible with modern lithographic methods used for preparation of integrated circuits.

The potential of plasmonics in chemical and biological research is just now being realized. One early application is surface-enhanced Raman scattering (SERS), the mechanism of which is still a subject of investigation. Another known application of plasmonics is surface plasmon resonance (SPR), which is used to study biomolecule binding reactions. SERS and SPR depend on the two extremes of metallic structures, random particles and a smooth surface. The applications and understanding of plasmonics are now being facilitated by modern nanofabrication technologies, which allows preparation of numerous metallic nanostructures, in particular regular patterns of particles, holes, or other features. These metallic nanostructures are already known to display unusual and unexpected optical properties, such as anomalously larger optical transmission through subwavelength nanoholes and directional—rather than diffracted—light transmission. Additionally, these are strong optical fields with subwavelength dimensions near such structures. These fields provide opportunities for new experimental capabilities such as subwavelength optical imaging.

Plasmonics is a highly interdisciplinary science that depends on the efforts of physicists, chemists, and biologists. Many subdisciplines are involved, such as computational electrodynamics, nanofabrication, bottom-up chemical self-assembly and biochemical spectroscopy, to name a few. Consequently, and perhaps appropriately, the many new results using plasmonics are appearing diffusively in many journals. Given the breadth and potential of plasmonics technology, it is now time for a journal dedicated to this important new science. We are thus pleased to introduce *Plasmonics*, a peer-reviewed journal to serve as the focal point for the principles and applications of surface plasmons.

The launch of *Plasmonics* is the culmination of two years of hard work by individuals from around the world. The editorial board and regional editors represent the world's experts on the science of plasmonics. These scientists are all internationally recognized in their respective plasmonics fields and clearly outline the future direction and the high level of scientific integrity which is to be applied to manuscripts published in *Plasmonics.* We subsequently thank the editorial board and regional editors for their time, support, and continued efforts. We especially thank these individuals for their enthusiasm for creation of this journal.

The scope of plasmonics covers all aspects of the properties of free electrons oscillation in metals and the interactions of these plasmons with the surrounding environment. The topics include advances in the theory, physics, and applications of surface plasmons to the rapidly emerging areas of nanotechnology, biophotonics, sensing, biochemistry, and medicine.

Additionally, topics include the fabrication and optical properties of noble metal nanostructures, patterned surfaces or materials, continuous or structure surfaces, and devices or wires for their multifarious applications. Typical applications might include, but are not limited to, surface-enhanced spectroscopic properties, such as Raman scattering or fluorescence, as well as developments in techniques such as surface plasmon resonance and near-field optical microscopy. *Plasmonics* also publishes papers that describe new plasmonic-based devices and their applications in analytical sensing.

In addition to original articles, *Plasmonics* also publishes reviews, rapid communications, letters to the editors, and technical and design notes. *Plasmonics* invites symposia papers to be collectively published together, through the initial consult and agreement with the editors. All manuscripts are subject to critical peer-review and are to be submitted electronically to: https://www.editorialmanager.com/plas/.

In this first issue of *Plasmonics*, we have amalgamated a review, original articles, a rapid communication, as well as contributions from the Molecular Plasmonics Meeting, held in Jena, Germany, in 2005. We thank Dr. Wolfgang Fritzche for the organization of papers from this meeting.

Finally, we would like to thank Springer, particularly Aaron Johnson and Kate Davies for making *Plasmonics* possible today.

We hope you will all support *Plasmonics* in the future and we welcome any suggestions you may have.

Many Thanks.

Kind Regards,

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