Volker Sorger*

Editorial

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The year 2015 will likely have a unique place in the history books for the optics and photonics community, since it is paired with various events that are exciting for this field. For one it is the 125th birthday of the Optical Society (OSA), and in addition, the United Nations declared 2015 to be the *Year Of Light*.

The first special issue of this year is dedicated to the topic of "Emerging Materials on Nanophotonics". While the field of nanophotonics has seen tremendous momentum through the support of plasmonics, opto-mechanics, and quantum photonics, it often are both the breakthroughs and continuing developments of materials that bring enabling opportunities for this field.

For instance, the area of 2D materials has grown out of its infancy being focused on Graphene into a cross-disciplinary subject area. Here, both scientific and engineering potential are seen in a) novel physical effects, b) higher functionality, and c) smaller form factors all found in one material option. Coincidentally, the US National Science Foundation recently held a path finding workshop on 2D materials *Beyond Graphene*, and followed through with a dedicated two-year program to fund engineering innovations of the same. Here, the bandgap tunability of trimetal Dichalcogenides (TMD) has found to bear rich bandgap tunability via composition, alloying, and altering design options such as substrate choices or stress, thus providing a large variety of functions. In this context it is interesting to note, that with the many material choices for TMDs, the importance of targeted approaches towards accelerated material-to-market was raised in the *Material Genome Initiative* by the US White House.

However, with the fundamental challenge of nanophotonics – weak interactions between light and matter – the choice of materials as both device building block and functionality delivery option needs to be synergistically considered. In this regard metal optics is seen as an emerging field that is able to contribute to this design evolution of devices and systems with ever growing constrains. However, materials with new functionalities and form factors allow utilizing field enhancement techniques in an unprecedented way. This, for instance, enables sub-wavelength scale photonic and opto-electronic devices with performance improvements such as utilized by the Purcell effect in light emitters, detectors, or electro-optic switching devices.

On the other hand, certain novel materials are able to clearly outperform any existing option; for instance transparent-conductive-oxides (TCO) have been found to be able to alter its refractive index by unity. Lastly, with the maturing of silicon photonics as an on-chip optics platform, higher integration options are considered in this special issue; passive devices such as waveguides made out of the electro-optically active Lithium Niobate aid high-functionality systems on-chip.

However, these novel materials and subsequent devices and systems need to be compared and benchmarked in order to be a guide for the next phase of opto-electronic integration and other technologies as carried out by some contributions of this special issue. As the festivities around this *Year Of Light* continue, this special issue summarizes some of the interesting work around the emerging materials for nanophotonics.

Concluding, I would like to thank for the input and help of the fellow Guest Editors, Jenifer Dionne, Alexandra Boltasseva, and Luke Sweatlock along with the Nanophotonics staff, Dennis Couwenberg and Tara Dorrian.

Sincerely

***Corresponding Author: Volker Sorger:**
E-mail: sorger@email.gwu.edu