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Editorial: Advanced nonlinear optical materials and devices

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Editorial on the Research Topic
Advanced nonlinear optical materials and devices

Nonlinear optical (NLO) materials have played a significant role in the advancement of various fields such as optoelectronic/photonics, optical communication, optical imaging, optical/THz frequency conversion, and optical signal processing. Several novel second-order and third-order NLO materials have been investigated in the last decade for discovering suitable and tailored properties matching the requirements of various applications [1–5]. This special issue was started with the intention to highlight the recent developments in advanced NLO materials. The issue starts with an article by Zhang et al. [6] that describes Supercontinuum generation (SCG) in fibers using a femtosecond (fs) Erbium-doped fiber laser. The authors claim their system to be efficient, compact, and inexpensive. They could achieve SCG with an approximate span of an octave in the 20 dB bandwidth (covering a range of 1,020–2,230 nm) in their hybrid highly nonlinear fibers. Ahmed et al. [7] investigated the femtosecond (800 nm, 70 fs) third-order NLO properties of four structurally unconstrained green fluorescence protein (GFP) chromophores. They observed a strong second hyperpolarizability, ($\gamma \sim 10^{-33}$ esu) in their molecules both experimentally and using theoretical calculations. They also report good optical limiting behavior in these chromophores. They also find impending applications in imaging and nonlinear frequency conversion. Wu et al. [8] have investigated the nonlinear absorption in a series of 98% deuterated DKDP crystals that were grown in solutions. The nonlinear absorption coefficient (β of ~10^{-1} cm/GW) of those 98% deuterated DKDP crystals was obtained using the Z-scan technique with the fourth harmonic generated wavelength (266 nm) of picosecond Nd:YAG laser pulses. Hwang et al. [9] have studied the likely polarization changes and analysed the optimum polarization matching status using values from their hologram results. Further, they used them as a study to progress the efficiency of a hologram resulting from a

holographic printer. These studies, though preliminary, from a small thematic-based issue clearly suggest a way forward towards the discovery of new materials and methodologies to address the ever-increasing demand for optics-based futuristic technologies.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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