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Review

Laser induced reduction of graphene oxide provides an easy-to-implement, facile, and controllable approach to avoid the complex additional transfer process needed in the traditional chemical and heat annealing reduction methods. This novel reduction approach accelerates the developments of graphene-based advanced optoelectronic devices intensively. Especially, researches on the diffractive photonic devices based on the gradual and steerable changes of the refractive index via the reduction process are in the ascendant. The research group of Professor Min Gu (Associate Deputy Vice-Chancellor for Research Innovation and Entrepreneurship at Royal Melbourne Institute of Technology University, Fellow of the Australian Academy of Science, Fellow of the Australian Academy of Technological Sciences and Engineering, Foreign Academician of Chinese Academy of Engineering) and Professor Xiangping Li (Institute of Photonics Technology, Jinan University, Guangzhou, China) have made great contributions to this cutting-edge area. In this article, a comprehensive review including ultra-broadband graphene oxide ultrathin lenses, athermally photoreduced graphene oxides for three-dimensional holographic images, etc. is given. These research achievements prove that laser reduced graphene oxide has been a paradigm-shifting platform for diffractive photonic devices.

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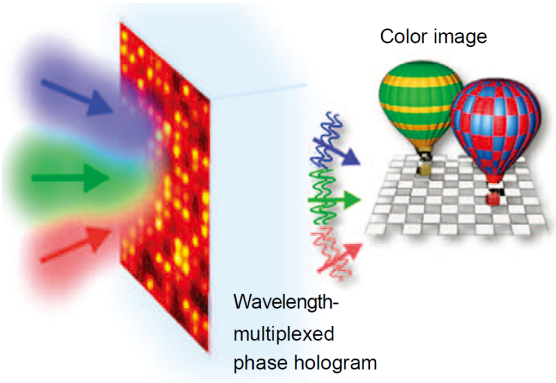

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Review

The lasing wavelength of optically pumped GaSb based semiconductor disk laser (SDL) just covers the wavelength range of 1.9~3.5 μm, and it can not only output circular Gauss beam, but also achieve high power continuous output at room temperature. At present, it has become a hot spot in the field of mid-infrared laser technology. The research group of Academician Lijun Wang and Researcher Cunzhu Tong from Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, has sufficiently studied and analyzed the research status of the optically pumped GaSb based semiconductor disk lasers. Most recently, the wavelength of GaSb based SDLs has been extended to 2.8 μm. The highest output power of the GaSb based SDLs has reached 17 W at the temperature of 20 °C. By using active stabilization, the GaSb based SDL with line-width of 20 kHz and output power of 1 W was realized. Moreover, the shortest pulse obtained from the GaSb based SDLs was generated as short as 384 fs by incorporating semiconductor saturable absorber mirrors (SESAM) in the cavity.

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