

将未来概念转化为实际应用：本征可拉伸的光电器件

DOI: 10.12086/oe.2023.231006.h01

可拉伸的光电器件因其丰富的功能而受到重点关注，它们可以被用于传统刚性光电器件难以实现的一些新型应用，特别是可穿戴和植入式设备等。

韩国首尔大学 Dae-Hyeong Kim 教授团队回顾了本征可拉伸光电器件和系统的最新研究进展，包括用于开发这些器件的材料、制造技术和集成方法。文章综述了近年来在发展本征可拉伸光电器件方面所做的研究工作，内容包括材料合成到器件制备。首先描述了本征可拉伸光电器件的基本结构，重点介绍了具有本征可拉伸性的功能弹性体复合材料，包括用于开发

功能弹性体复合材料的电子填料、弹性体、表面活性剂及其制备各种器件的加工方法。其中详细地介绍了通过改变填料的特性(如尺寸、电子元器件种类、重量百分比等)来控制功能弹性体复合材料电学、力学和光学性能的方法，并讨论了这些材料的大面积加工、高密度和高分辨率图形化以及与其他可拉伸器件实现系统集成技术。然后，描述了功能弹性体复合材料作为本征可拉伸光电器件组成部件的应用，同时提供了本征可拉伸光电子器件以及本征可拉伸集成系统的一些实例。最后，提出了本征可伸展光电器件领域所面临的挑战。

Opto-Electronic Advances, 2022, 5(8): 210131.

<https://www.ojournal.org/article/doi/10.29026/oea.2022.210131>.

Translating futuristic device concepts into practical applications: intrinsically-stretchable optoelectronic devices

DOI: 10.12086/oe.2023.231006.h01

Optoelectronic devices in stretchable formats have been extensively investigated to realize novel applications such as soft robotics, wearable optical sensors, wearable smart displays, and bio-integrated healthcare systems.

Prof. Dae-Hyeong Kim's group discuss the recent research efforts in developing intrinsically-stretchable optoelectronic devices ranging from materials synthesis to device fabrication. The basic building blocks of the intrinsically-stretchable optoelectronic devices are firstly described, with a focus on introducing functional elastomeric composites with intrinsic stretchability. Namely, the

electronic fillers, elastomers, and surfactants used to develop the functional elastomeric composites are reviewed, along with their processing methods which are used to fabricate various devices. Then, the application of the functional elastomeric composites as the device components of the intrinsically-stretchable optoelectronic devices are described, while providing representative examples of intrinsically-stretchable optoelectronic devices, including light-emitting and light-absorbing devices, and some examples of intrinsically-stretchable integrated systems. Finally, the remaining challenges of intrinsically-stretchable optoelectronic devices are also presented. The methods and strategies described in this review will be helpful in suggesting a new way for technological translation of intrinsically-stretchable optoelectronic device technology from academia to industry.

Opto-Electronic Advances, 2022, 5(8): 210131.

<https://www.ojournal.org/article/doi/10.29026/oea.2022.210131>.