Integrated micro-LED and micro-PD for ultraviolet on-chip communications

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The progressive downscaling of silicon-based microelectronic devices has resulted in compact and advanced integrated circuits capable of fast data processing and computing. Similarly, the miniaturization of conventional optoelectronics is a critical technological frontier for emerging applications in lighting, imaging, communication, and sensing. In this talk, we will present the advancements made by our research team in developing miniature dual-functional diodes (DF-diodes) and their arrays, which possess both light-emitting and light-detecting capabilities. Our high-performance micro-scale DF-diodes have achieved a record-high responsivity in the deep ultraviolet region, coupled with an ultrafast response rise time in light-detecting mode. In light-emitting mode, these diodes exhibit an exceptionally high -3 dB optical bandwidth of approximately 600 MHz along with enhanced external quantum efficiency. Notably, the development of these micro-scale DF-diodes paves the way for the realization of effective solar-blind on-chip communication systems in future.

Short Bio:

Huabin Yu received his PhD degree in Electronic Science and Technology from University of Science and Technology of China, China. He is interested in the III-nitride-based micro/nano-scale optoelectronics and integrated photonics for optical communication, sensing, display, and interconnect. He has published over 75 journal and conference papers, including articles in Nature Electronics, Laser & Photonics Review, Light: Science & Applications, Advanced Optical Materials, Optics Express, and Optics Letters, etc., with a total citation count of approximately 1600.