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Micro Ultraviolet LED with Photonic Crystal

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Our group has succeeded to fabricate a Photonic Crystal on Micro-Ultraviolet (UV) LED. A photonic crystal is a structure in which the refractive index changes periodically, and is used to confine light in a small area and enhance the interaction between light and materials. By artificially creating a periodic structure with a size that matches the wavelength of UV light, it is possible to realize metamaterials with optical properties that are not possible with ordinary materials. In recent years, due to advances in semiconductor microfabrication technology, basic operation with low power consumption has been confirmed in optical devices such as optical switches, lasers, optical memories, and laser light sources.

As a light source for micro-LED displays, our group has been actively developed the full-color displays by combining micro-UV LEDs and RGB phosphors. Optical lens control of the light emitted by a micro-sized UV-LED chip not only increases the cost, but also makes it difficult to fabricate a fine lens array. Therefore, by using photonic crystals, UV-light can be controlled efficiently at low cost.