Leibniz Ferdinand Braun Institut

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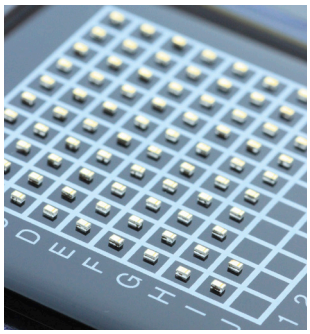
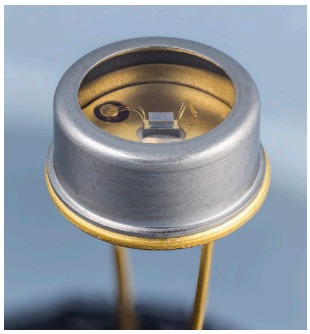
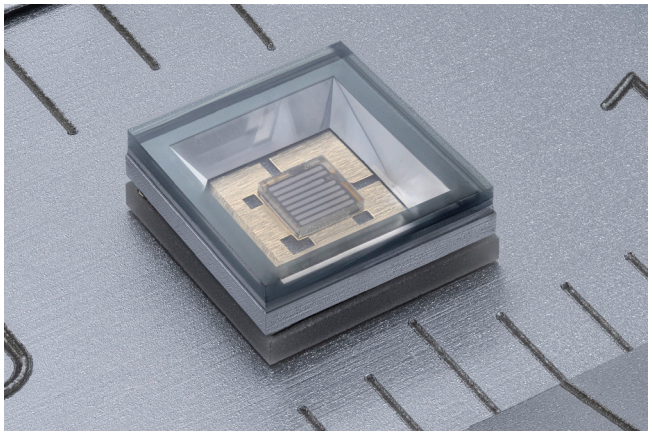
Ultraviolet light sources

The Ferdinand-Braun-Institut develops AlGaInN-based light emitting diodes (LEDs) with emission in the ultraviolet (UV) spectral region. Epitaxial layer structures are deposited by metalorganic vapor phase epitaxy on sapphire substrates. Typical chip sizes are 0.66 mm × 1.06 mm and 1 mm × 1 mm. The chips are flip-chip soldered either on SMD packages or on structured AlN heat spreaders with subsequent wire bonding on TO metal cans. The UV LEDs emit through the sapphire substrate. The optical powers of LEDs operated at 350 mA are typically 25 mW for an emission wavelength of 310 nm and 15 mW for 265 nm.

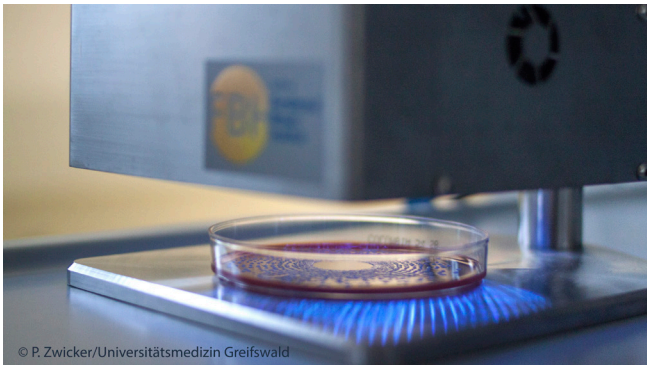
The AlN-GaN-InN material system covers the wavelength range from the far UV over the whole visible region to the near infrared. In collaboration with Technical University of Berlin FBH works particularly on the realization of LEDs in the UVB (300 - 330 nm) and UVC (260 - 270 nm, 225 - 240 nm) spectral region.







UV LEDs of different designs.



UV LED system for skin-tolerant inactivation of pathogens.

Application capability of UV LEDs

- disinfection of water, surfaces, and air
- sterilization (e.g. medical technology, food industry)
- skin-tolerant inactivation of pathogens (UV antisepsis)
- sensing of gases and pollutants (nitric oxide, nitrates)
- materials processing (e.g. paints, coatings, glues)
- treatment of skin diseases (e.g. psoriasis)
- plant growth lighting
- detection of fluorescence markers, biological agents

Profile

The Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (FBH) researches electronic and optical components, modules and systems based on compound semiconductors. In the field of III-V electronics, it manufactures high-frequency devices and circuits for communications, power electronics, and sensor technology. Moreover, FBH develops light sources from the visible to the UV spectral range: high-power diode lasers, UV light sources, and hybrid laser systems. Applications range from medical technology, materials processing and sensors to optical communications in space and integrated quantum technology. In close cooperation with industry, its research results lead to cutting-edge products.

The institute is a member of the Leibniz Association and part of Research Fab Microelectronics Germany (FMD).