CASE STUDY

Silanna UV

Lighting the way for ultraviolet disinfection in industry

Australian-made ultraviolet LED technology could provide a safer, more energy-efficient way to kill harmful bacteria and viruses in industrial environments.

Across healthcare, manufacturing and food production, keeping products and processing environments free from harmful microbes is a constant challenge. In the event of contamination, the costs can be astronomical.

One way of controlling such events is the use of ultraviolet–C (UVC) light – a type of high-energy radiation that kills germs and bacteria by destroying their DNA. Historically, UVC light was generated using mercury arc lamps but it is gradually being phased out due to it's toxicity, high lamp energy consumption and use with harsh, environmentally unfriendly chemicals such as heated hydrogen peroxide to be effective.

To stay ahead of these changes, we need new and effective ways to produce UVC light.

Australian semiconductor manufacturer Silanna UV, headquartered in Queensland, is pioneering the solution by developing LEDs, that produce the shortest UVC wavelength commercially available in the world.

UVC LEDs offer many benefits over mercury lamps: they use less power and can be switched on and off quickly. They are made using a combination of key semiconductor materials, including aluminium nitride and gallium nitride, through Silanna's patented 'short-period superlattice' technology.

"In the visible light industry, the lights in your room used to be incandescent bulbs, and now they're all LEDs. The same is about to happen in the UVC world, where they're going to transition from a heated, wet chemical environment to a completely dry, low-energy solution," Dr Robbie Charters, Vice President – Operations at Silanna UV explained.

Silanna's UV LEDs can operate in harsh environments, such as cold, damp conditions where bacteria, including Listeria, can be difficult to control.

While the company outsources some of its fabrication overseas, the international market isn't always a good answer. One of the major challenges Silanna faces as a smaller company has been finding foundries that will produce the lower volumes it needs.

"Foundries typically have to run at 90% capacity to make money. The potential to be bumped by one of their big customers is very large and very real," said Dr Robbie Charters.

Silanna engineers at the company's Brisbane epitaxial wafer manufacturing facility, where advanced processes are used to develop next-generation ultraviolet LED technology
Image courtesy of Silanna UV

With no common facility for low-volume production in Australia, Silanna has had to build its own facility in Brisbane to expand its capability beyond prototype development.

The Brisbane facility brings more in-house fabrication capability to improve supply-chain resilience, but Silanna said access to a commercial semiconductor fabrication facility (fab) in Australia with scalability to higher volume production would make a major difference.

"The facility would need to be commercially run by semiconductor professionals who understood the market, with reliable processes, predictable timelines, demonstrated yields and internationally competitive costs."

In terms of opportunities, Silanna believes Australia could build on the things it already does well.

"Australia has existing strengths and expertise in areas that we can target and grow manufacturing capability in."