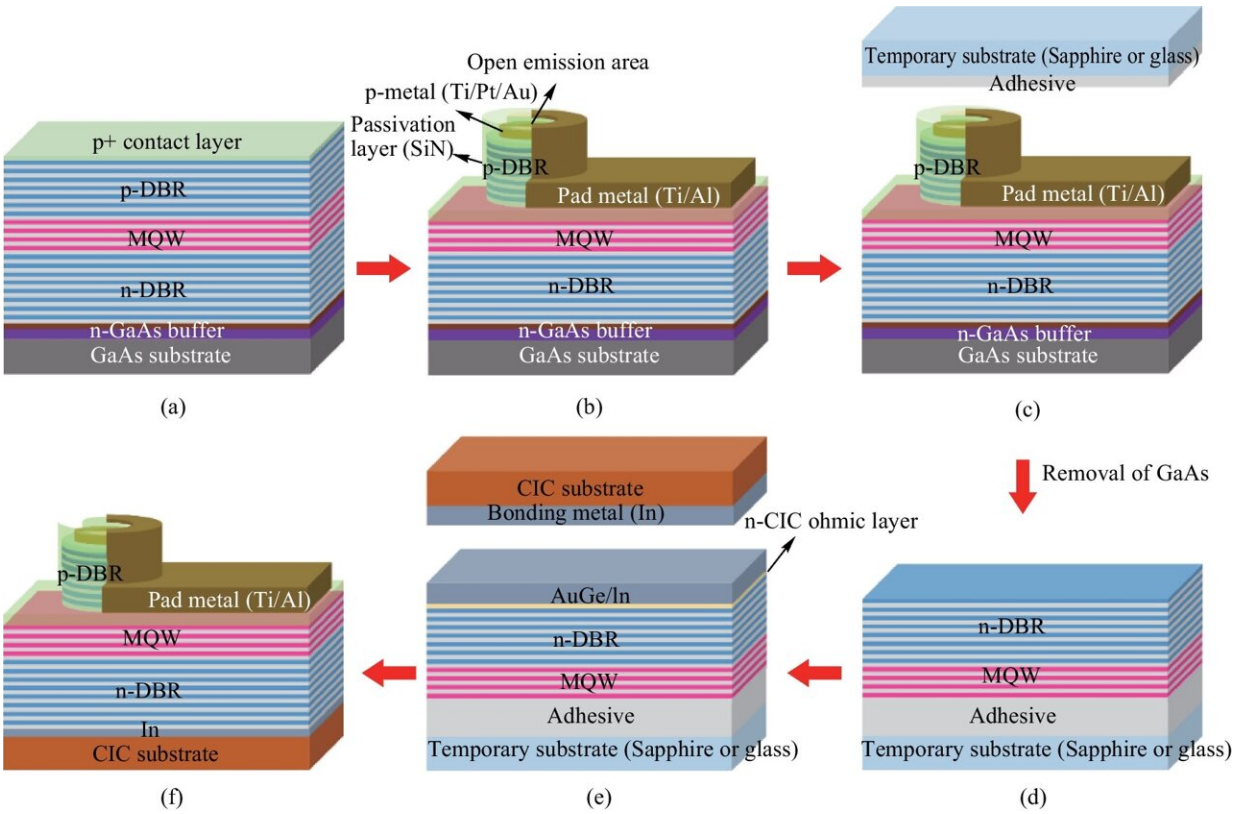


# New research sheds light on enhanced performance of thin-film VCSELs on composite metal substrate

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VCSEL device transfer procedure onto CIC substrate by double wafer bonding techniques and transfer technologies. Credit: *Frontiers of Optoelectronics* (2023). DOI: 10.1007/s12200-023-00086-z

Researchers led by Prof. Ray-Hua Horng, a leading expert in semiconductor device technology at Yang Ming Chiao Tung University (NYCU), Hsinchu, Taiwan, China have published a research paper titled "[Study on the performance of thin-film VCSELs on composite metal substrate](#)" in the journal *Frontiers of Optoelectronics*. This work introduces innovative methods that are poised to reshape the landscape of semiconductor technology.

In the study, Prof. Horng explores the remarkable potential of thin film p-side up vertical-cavity surface-emitting lasers (VCSELs). These advanced lasers are engineered on a composite metal substrate known as Copper/Invar/Copper (CIC). The breakthrough is achieved through a novel twice-bonding transfer and substrate removing technique.

The study findings reveal that VCSELs on a composite metal substrate not only significantly influence the characteristics of thin film VCSELs, but also bring about a substantial improvement in the device's thermal performance.

This development is set to completely transform the field of [semiconductor](#) device technology, offering enhanced performance and heat management that were previously unattainable.

Prof. Horng's research offers promising applications in various sectors, including telecommunications, [data centers](#), and optical communication. The findings have far-reaching implications for industries and technologies reliant on laser systems for [data transmission](#) and signal processing.

This study opens the door to a new era of semiconductor device technology, with the potential to revolutionize the performance and thermal management of not only thin-film VCSELs, but also several high-power [electronic devices](#). It represents a remarkable advancement

that could fundamentally alter the future of the semiconductor industry.

**More information:** William Anderson Lee Sanchez et al, Study on the performance of thin-film VCSELs on composite metal substrate, *Frontiers of Optoelectronics* (2023). [DOI: 10.1007/s12200-023-00086-z](https://doi.org/10.1007/s12200-023-00086-z)

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