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Type-I and type-II interband cascade lasers emitting around 2.7 μm

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Introduction:

The Sb-based **type-II interband cascade laser (ICL)** stands out as the most efficient choice for the 3-5 μm wavelength range, with optimal performance **between 3.3 and 3.8 μm**. While recent studies have improved ICL performance above 4 μm, less focus has been given to shorter wavelengths. Though **type-I quantum well diode lasers** operate in this range, their **performance drops above 2.5 μm**. Developing ICLs for these shorter wavelengths could greatly improve laser performance. For this, ICLs with type-I QWs have been realized and compared to traditional type-II ICLs.

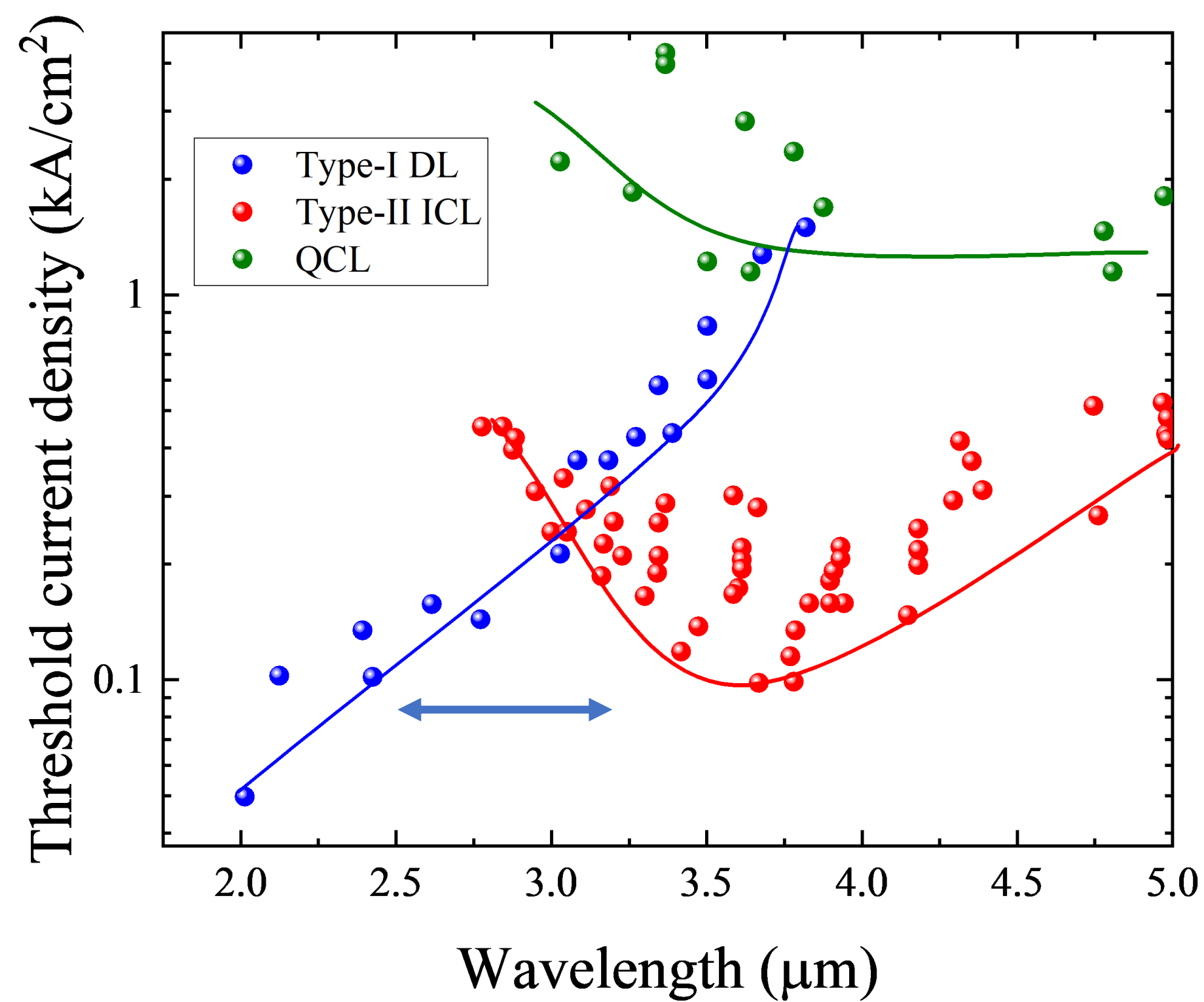


Fig. 1. Laser performance in the MIR
Sweeney et al. Mid-IR Optoelectronics, Elsevier (2020)

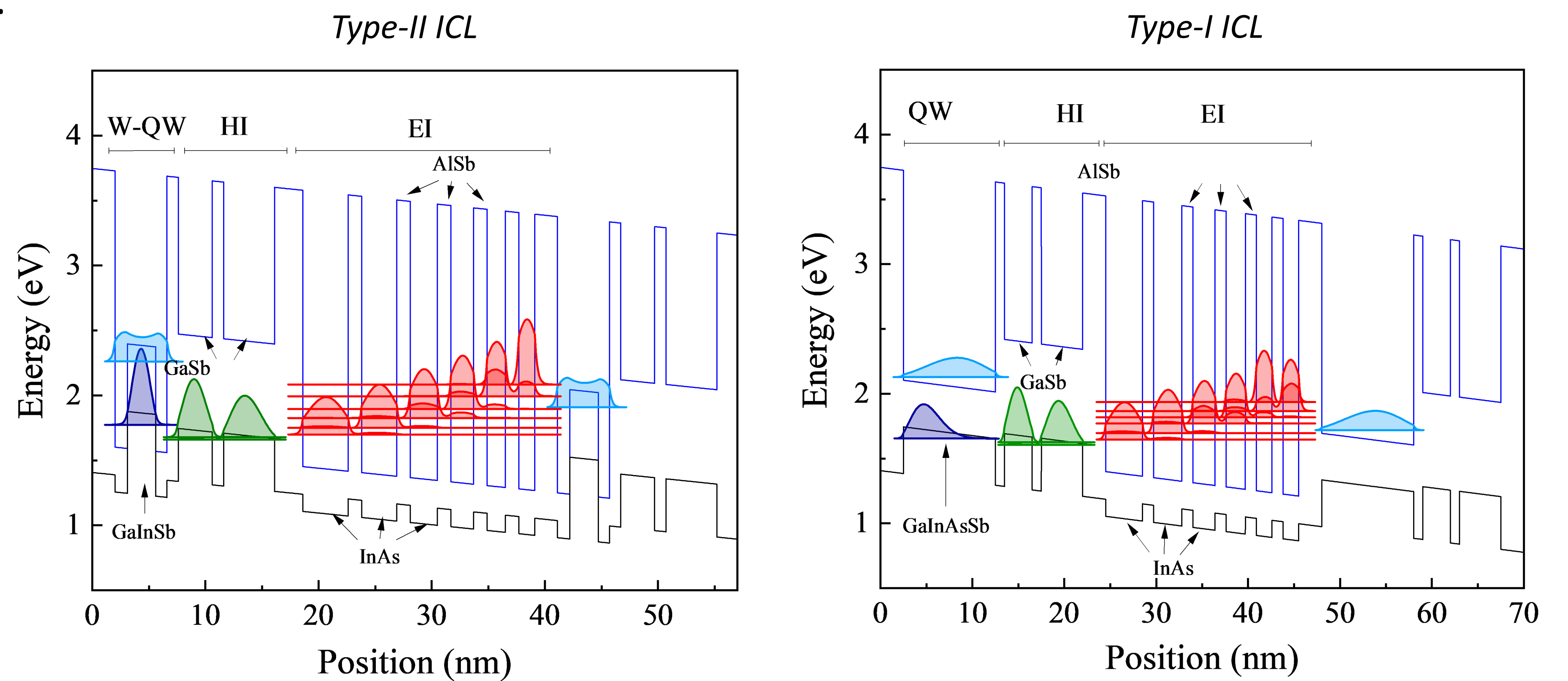


Fig. 2. ICL band structures with a) type-II QW and b) type-I QW

Structural characterizations:

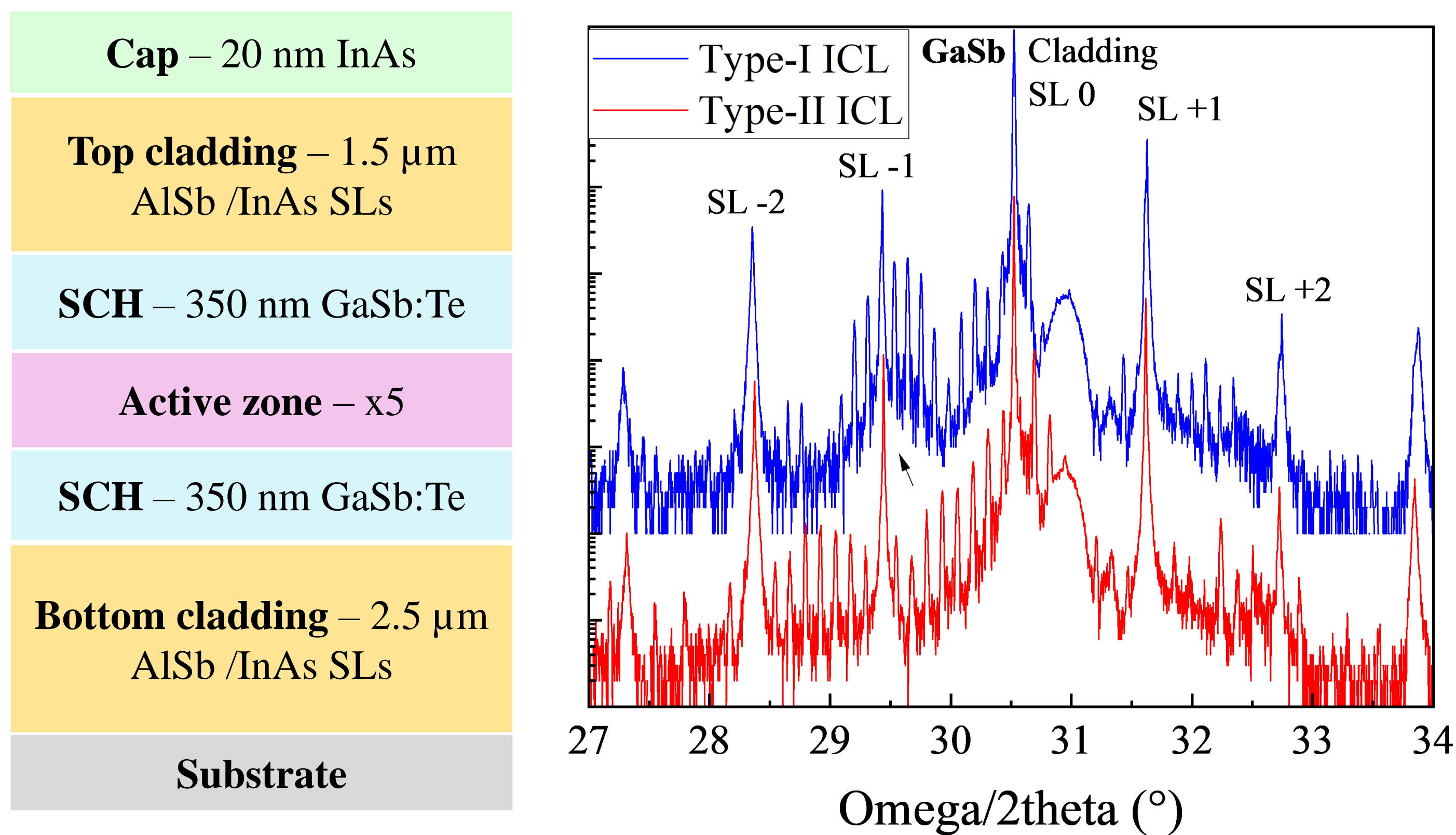
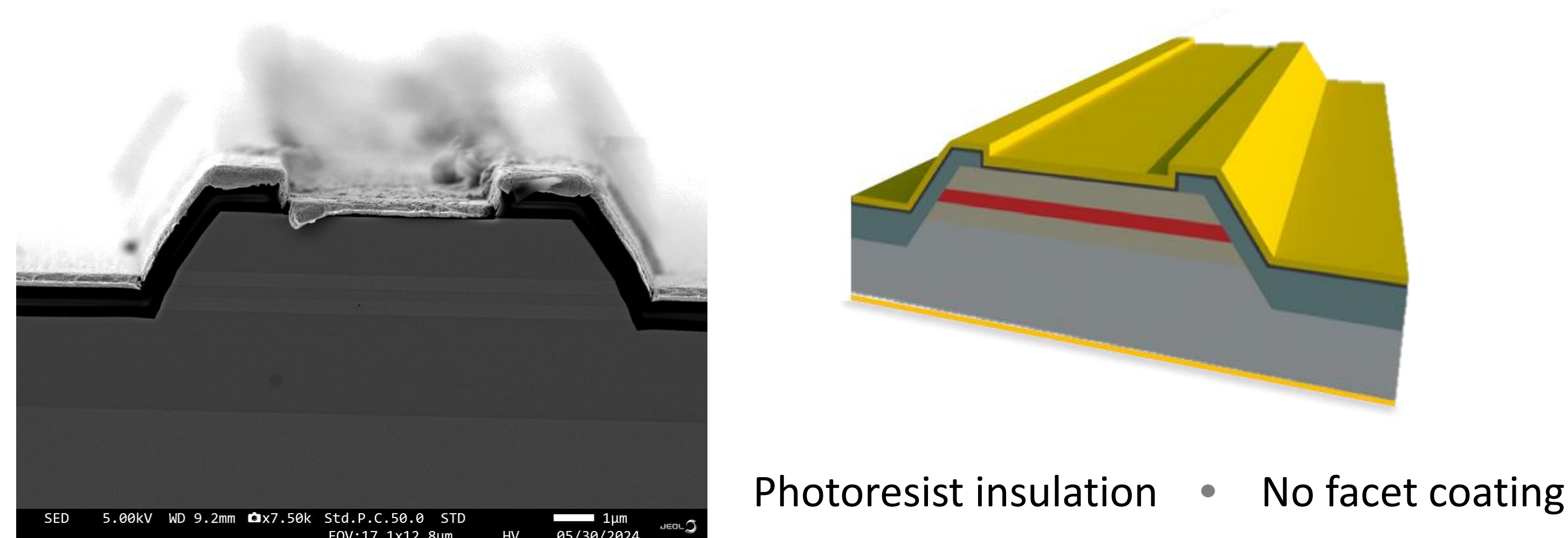


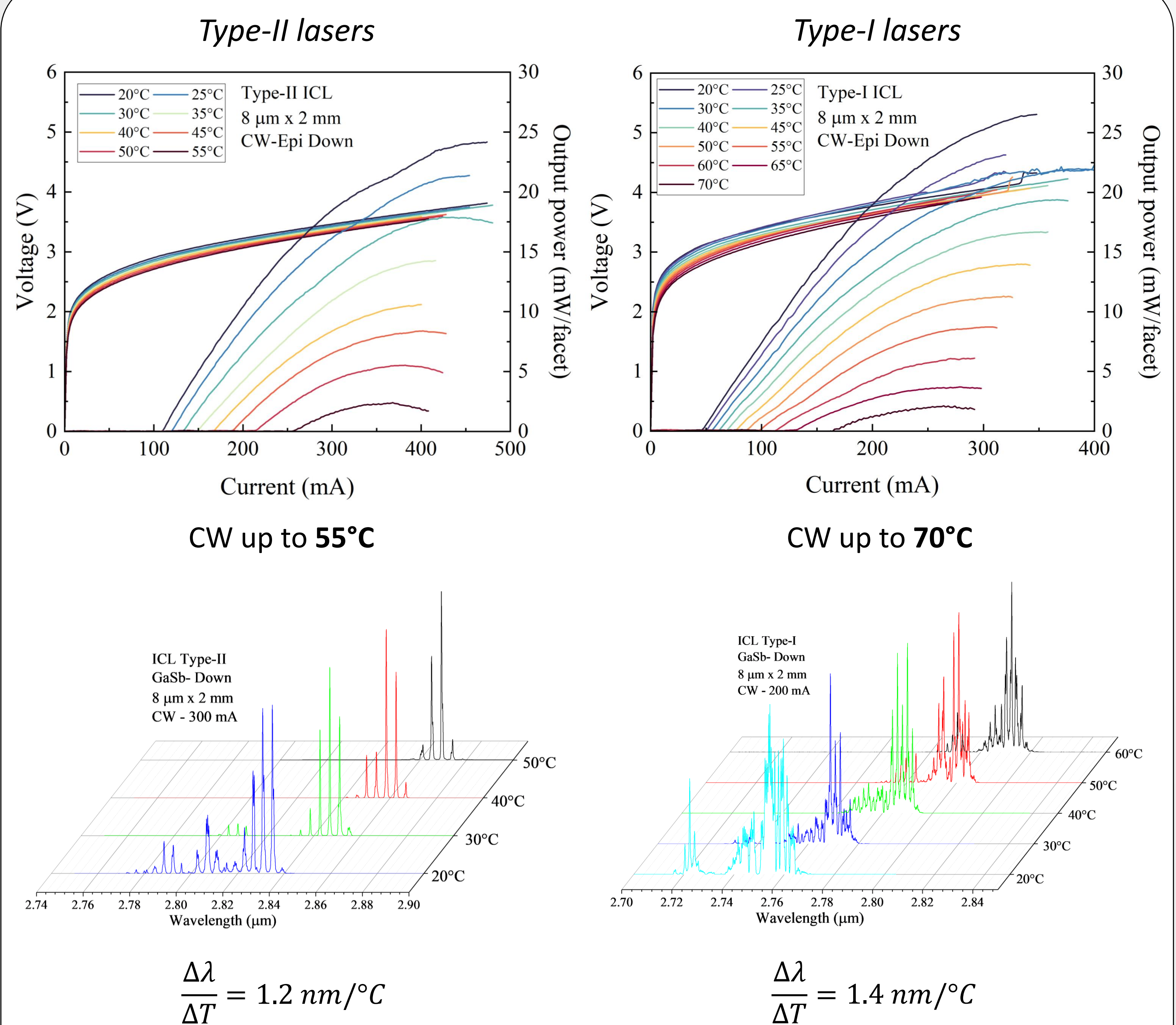
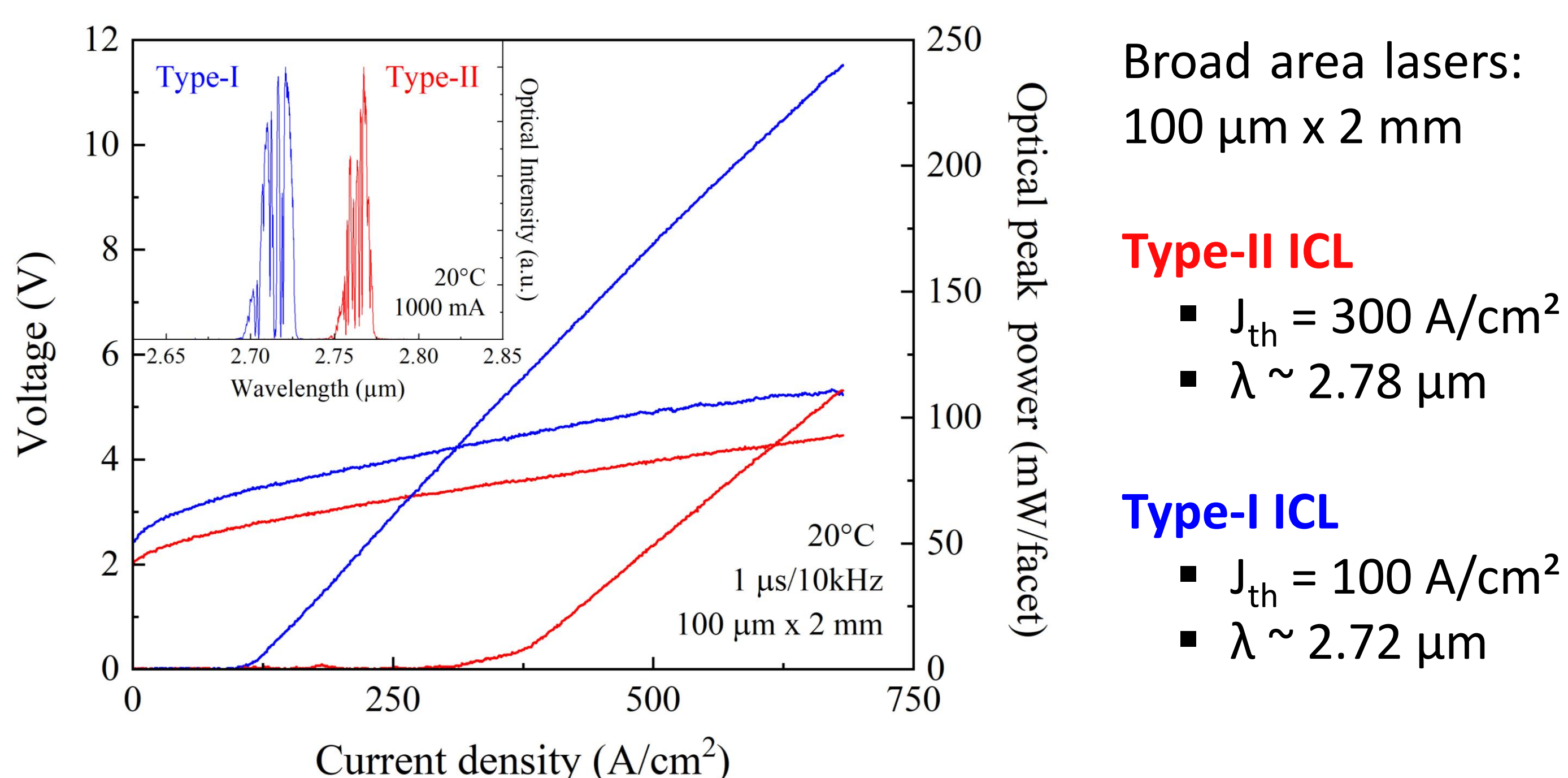
Fig. 3. ICL structure

Process:

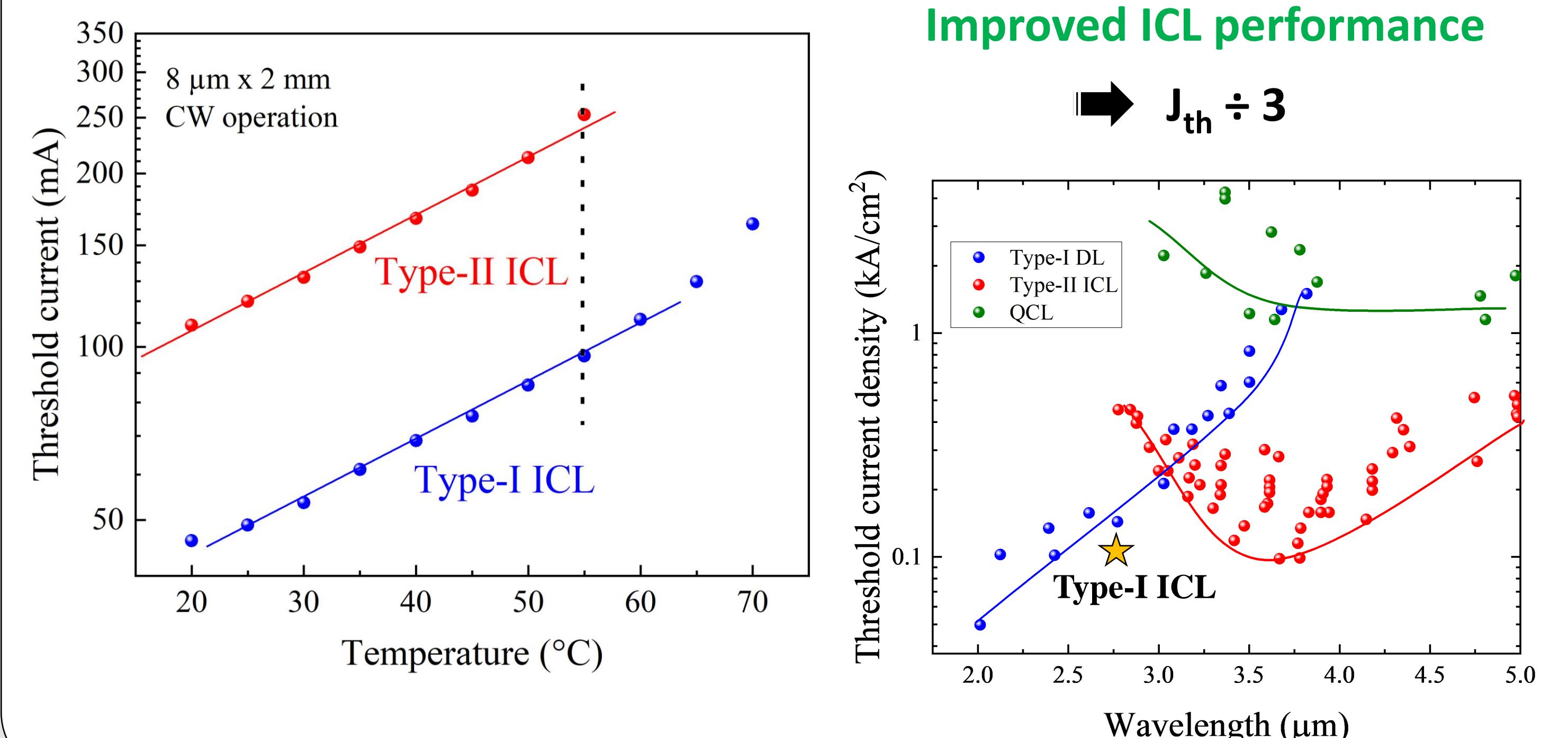


Photoresist insulation • No facet coating

Results:



Conclusion:



Funding sources:

