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## Transparent electrodes based on GaAs/Au subwavelength gratings for VCSEL applications

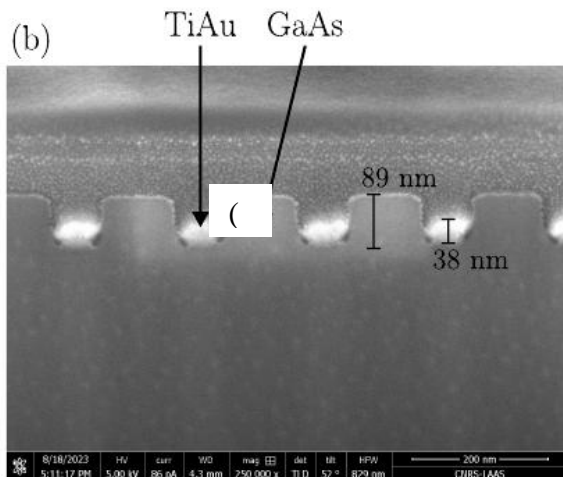
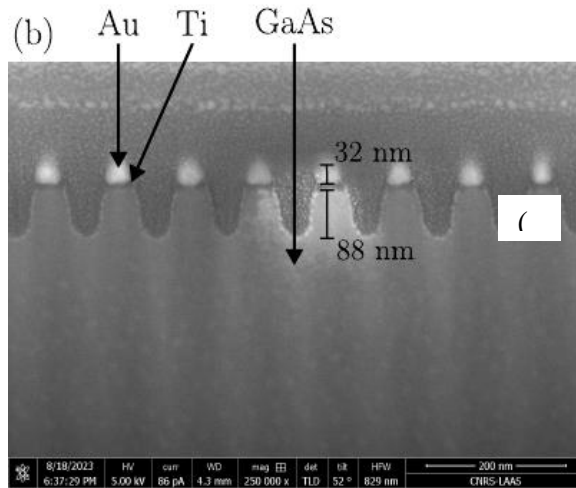
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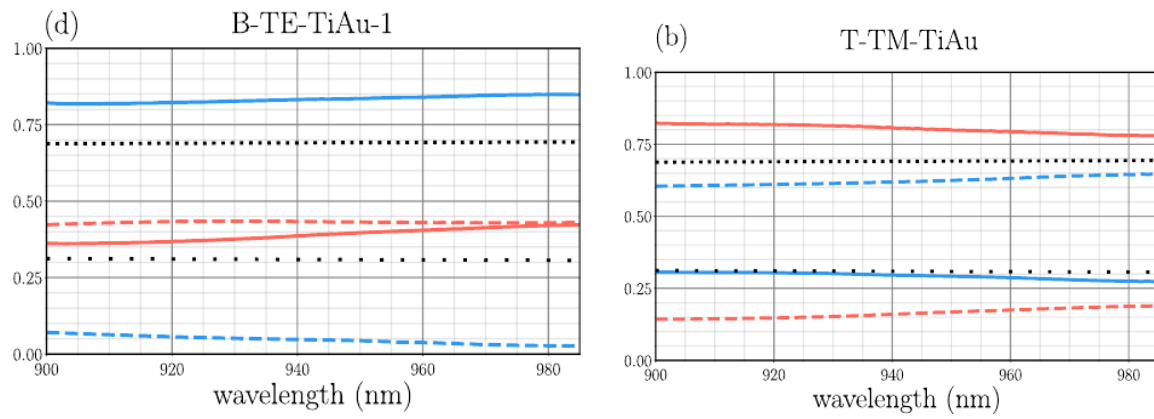
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We will present the fabrication of a novel approach for transparent electrodes based on a semiconductor deep-subwavelength monolithic high-contrast grating (MHCG) integrated with metal stripes [1]. Two types of combination between GaAs-based MHCG and Au stripes within a deep sub-wavelength grating enable high transmission (>80%), associated with a low sheet resistance, have been measured for TE and TM polarizations respectively in the near-infrared (around 940nm). These structures, that mainly rely on the high refractive index of the employed semiconductor, can be optically designed as highly transparent or highly reflective, in a broad spectral range below the semiconductor band-gap. Electrical injection uniformity in optoelectronics devices such as LED or VCSEL could strongly benefit from this new approach.





**Fig. 1** Fabrication and optical characterization of semiconductor-metal deep-subwavelength gratings. (a,c) TE configuration with metal stripes in the grating grooves. (b,d) TM configuration with metal stripes above the grating ridges.

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### References

- [1] T. Czystanowski, A.K. Sokół, et al. "Transparent Electrode Employing Deep-Subwavelength Monolithic High-Contrast Grating Integrated with Metal", *Optics Express* **28.19**, 28383 (2020).