ON-CHIP TWO-OCTAVES SUPERCONTINUUM GENERATION IN MID-IR SIGE WAVEGUIDES

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Mid infrared spectroscopy is a widely used technique to perform molecular sensing, as most of the molecules have their fundamental vibrational and rotational resonance in this spectrum range. Each molecule absorbs light at the specific wavelength and produces a unique absorption pattern in the spectra that makes it possible to identify the targeted molecules. In this context, we present the experimental study of on chip supercontinuum generation in the mid-infrared range, Thanks to a Ge-rich graded-index platform, second-order dispersion engineering and low propagation losses are achieved. A broad spectrum is obtained from 3 to 13 μm wavelength (a spectral band of more than 2500 cm^{-1}) for a pump wavelength at 8.5 μm, in a 5.5 mm long waveguide. Moreover, both results from numerical and experimental outcome are in agreement. Therefore, this work leads to the development of many mid-infrared wideband applications.

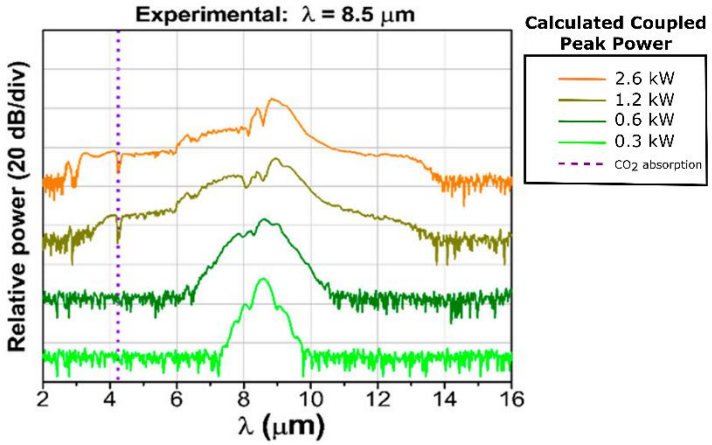

Fig. 1: Generation of supercontinuum: experimental output in a 5.5 mm long waveguide for different values of optimal peak power, for input pump at 8.5 μm wavelength.

References:

[1] M. Montesinos-Ballester et al., On-Chip Mid-Infrared Supercontinuum Generation from 3 to 13 μm Wavelength. ACS Photonics. 7(12): 3423-3429, 2020.