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Ultra-broadband Supercontinuum Generation in Dispersion Engineered Stoichiometric Si3N4 Waveguides

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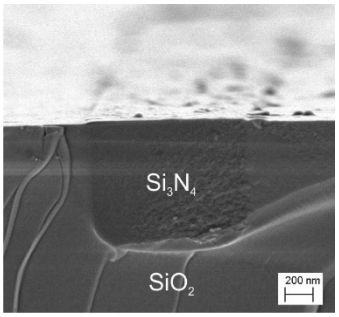

Integrated optical waveguides seem to be appropriate for future telecommunication systems, due to their capability to realize complex optical setups within a small foot-print. For these applications a CMOS-compatible production process and low nonlinear losses in the near-infrared are requirements that can be matched by using silicon nitride (Si3N4) based waveguides. The high transparency of Si3N4 waveguides over a broad spectral range is especially useful for the generation of supercontinua (SC). Broad SC around the telecom wavelength 1550nm are, e.g., required for the realization of terabit per second transmitter chips in telecommunication networks [1]. Here, we demonstrate the generation of ultra-broadband frequency combs using Si3N4 waveguides, with engineered anomalous dispersion that encloses the pump wavelength at 1560nm [2]. A successful shift of the SC to longer wavelengths beyond 2:6mm, compared to previous measurements at an excitation wavelength of 1064nm [3], is reported.

References

1. J. Pfeifle et al., “Coherent terabit communications with microresonator Kerr frequency combs,” Nat. Photonics 8, 375–380 (2014).
2. J. P. Epping et al., “High confinement, high yield Si3N4 waveguides for nonlinear optical applications,” Opt. Express 23, 642 (2015).
3. J. P. Epping et al., “On-chip visible-to-infrared supercontinuum generation with more than 495THz spectral bandwidth,”Opt. Express 23, 19596 (2015).