

Title: Dispersion-Engineered Silicon Carbide Channel Waveguide for Mid-Infrared Region Supercontinuum Generation

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Abstract: Supercontinuum generation in mid-infrared (mid-IR) regime is critical for major applications. This paper explores this phenomenon in Silicon Carbide based channel waveguide with Silica cladding. We numerically investigated a 1-cm-long channel waveguide using silicon carbide (SiC) as core material and Silica (SiO₂) for upper and lower claddings which demonstrated anomalous dispersion across a wide spectral range around the pump wavelength, resulting in supercontinuum generation in the mid-infrared regime. Using a pump source at 1550 nm for a pulse duration of 50 femtoseconds at 5KW input pulse power, a supercontinuum (SC) spanning from 0.91 to 4.55 μm above -40 db spectral power has been generated. This is to the authors' knowledge, first exploration of silicon carbide as a guiding material in channel waveguide.

Keywords: Supercontinuum, generation ,Electric, potential, Spectroscopy, Claddings, Silicon carbide, Scalability

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