High-confinement gallium nitride-on-sapphire waveguides for integrated nonlinear photonics
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High-confinement gallium nitride-on-sapphire waveguides for integrated nonlinear photonics
We demonstrate a highly effective nonlinearity of 7.3 W^{-1} m^{-1} in a high-confinement gallium nitride-on-sapphire waveguide by performing four-wave mixing characterization at telecom wavelengths. Benefitting from a high-index-contrast waveguide layout, we can engineer the device dispersion efficiently and achieve broadband four-wave mixing operation over more than 100 nm. The intrinsic material nonlinearity of gallium nitride is extracted. Furthermore, we fabricate microring resonators with quality factors above 100,000, which will be promising for various nonlinear applications.

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