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标题: Efficient terahertz-wave generation via four-wave mixing in silicon membrane waveguides

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摘要: Terahertz (THz) wave generation via four-wave mixing (FWM) in silicon membrane waveguides is theoretically investigated with mid-infrared laser pulses. Compared with the conventional parametric amplification or wavelength conversion based on FWM in silicon waveguides, which needs a pump wavelength located in the anomalous group-velocity dispersion (GVD) regime to realize broad phase matching, the pump wavelength located in the normal GVD regime is required to realize collinear phase matching for the THz-wave generation via FWM. The pump wavelength and rib height of the silicon membrane waveguide can be tuned to obtain a broadband phase matching. Moreover, the conversion efficiency of the THz-wave generation is studied with different pump wavelengths and rib heights of the silicon membrane waveguides, and broadband THz-wave can be obtained with high efficiency exceeding 1%. (C) 2012 Optical Society of America

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