High confinement, high yield Si_3N_4 waveguides for nonlinear optical applications

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Abstract: In this paper we present a novel fabrication technique for silicon nitride (Si_3N_4) waveguides with a thickness of up to 900 nm, which are suitable for nonlinear optical applications. The fabrication method is based on etching trenches in thermally oxidized silicon and filling the trenches with Si_3N_4. Using this technique no stress-induced cracks in the Si_3N_4 layer were observed resulting in a high yield of devices on the wafer. The propagation losses of the obtained waveguides were measured to be as low as 0.4 dB/cm at a wavelength of around 1550 nm.