Presentation

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Octave-spanning long-range plasmonic waveguide based on semiconductor-loading for mid-infrared monolithic sensors

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Abstract

Semiconductor-loaded plasmonic (SLSPP)-waveguides are a very efficient link for optoelectronic devices, facilitating miniaturized photonic integrated circuits. However, for long-wave infrared applications (8-12 µm), the material selection is challenging as most commonly used mid-IR materials absorb in this region. Therefore, we selected and investigated the properties of germanium in a hybrid semiconductor-metal-configuration to overcome these limitations. The experimental characterization of Si(substrate)-Au-Ge fabricated SLSPP-waveguides show very good agreement with FEM-simulations. Moreover, the realized devices offer low losses between 8.8 and 22 dB/mm (single device) and even within 8.8-15 dB/mm (multiple devices), respectively, for the entire investigated octave-spanning 5.6 – 11.2 µm range.

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KEYWORDS

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