Abstract—In this work, a novel design of hybrid integrated plasmonic-photonic waveguide is proposed to work at 1550 nm wavelength and have low loss specification of photonic waveguides and high optical mode confinement of plasmonic waveguides. Unlike other designs, metallic nanoparticles are deposited inside the mask layer to have less radiation from the waveguide and increase transmitting light. Moreover, by using wedge shape for the mask layer of the waveguide, higher order modes suppress.
In this work, the novel hybrid wedge integrated plasmonic waveguides are proposed with less insertion loss and more higher order mode suppression. As shown in Fig. 1, hybrid plasmonic and photonic waveguides, ratio of $|S_2|$ to $|S_1|$ coefficients of waveguides in Fig. 1, hybrid integrated plasmonic waveguides. As shown in Fig. 2, hybrid wedge integrated plasmonic waveguide and photonic waveguide with Si mask layer are different as discussed before. As seen in Fig. 2, both waveguides of Fig. 1 have acceptable matching (a) and (b). To support that the proposed waveguides in Fig. 1 have more advantage compare with conventional hybrid plasmonic photonic is more efficient than other simulated waveguides. Moreover, as seen in Fig. 4, all of these waveguides should be compared with conventional hybrid plasmonic leaky wave optical antenna with slab-like silicon waveguide using optimized LOCOS process. Optics and Photonics, 2018.


