5. Conclusion

In summary, we have proposed an O-band compact PSR by exploiting 90° bends. We take advantage of bend structure with a radius of only 10 μm to help shorten the PSR and maintain high efficiency, achieving the bending, polarization splitting, rotating of input light beam at the same time. Smaller radius might be possible to be used for even shorter PSR design. Numerical simulations show that the present PSR has a high TM-TE polarization conversion efficiency of −0.11 dB and high TE-TE conversion efficiency of −0.09 dB at 1310nm, while the extinction ratio is 27.36 dB and 30.61 dB respectively. Moreover, the 3-dB bandwidth of proposed PSR covers all the O-band range. Due to its general principle, similar design with different geometry parameters can be applied for operating in other wavelength ranges, including C-band, L-band, and mid-IR. Furthermore, this design uses SiO_2 as top-cladding, making it compatible with most advanced CMOS technology. Thus it's ready for fabrication and testing by using standard foundry services [16]. This design provides a potential solution for polarization handing in future large-scale high-density photonic integrated chips.

Acknowledgments

The authors would like to thank the support of AcRF Tier 2 Grant MOE 2013-T2-2-145 from MOE Singapore.