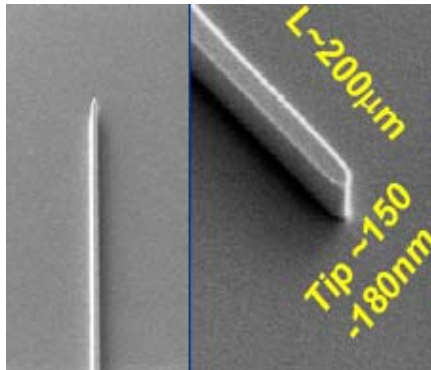


Si-Microphotonics Passive Components Library

Silicon microphotronics has become a critical area of research and development for new-generation communication and computation devices integrated on a chip. Passive photonic devices are critical part of whole photonic circuits, for *light guiding, bending, splitting, coupling, filtering*, and so on. They are the building blocks for constructing the compact photonic integrated circuits.

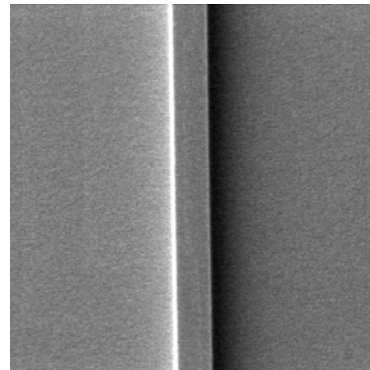
Passive photonic devices with good performances are in high demand for promising commercial applications. Researchers at IME have established a set of design rules in designing, fabricating and characterizing passive photonics devices, such as fiber-to-waveguide couplers, sub-micron dimension waveguides, small radius bends, splitters, directional couplers, MMIs, ring resonators, OADM, AWGs and optical buffers. The devices are realized based on silicon nanowires, SOI ribs, and SiN nanowires. The characterized passive devices demonstrate high performances comparable with the simulations design targets.

Coupler



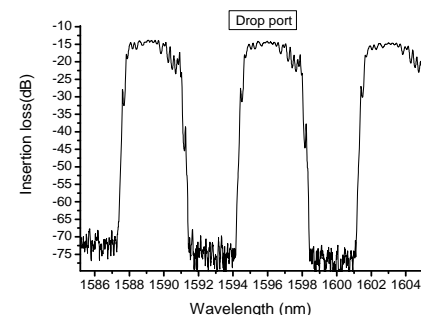
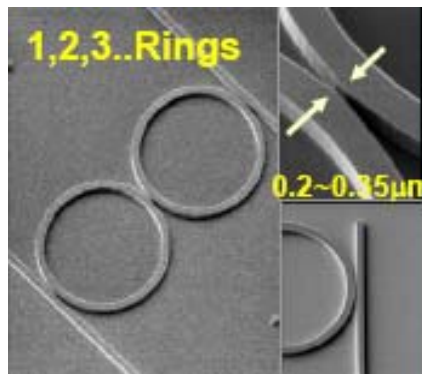
Coupling loss: 2.5dB/facet
WG: 500nm x 200nm
 W_{tip} 150nm, L_{tip} 200nm

Waveguide

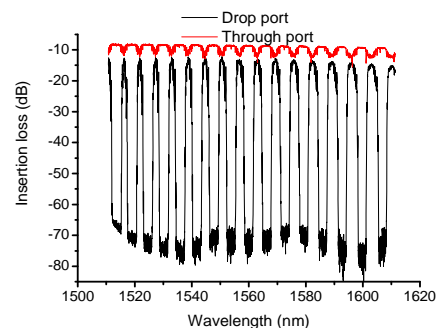


Propagation loss ~2.8dB/cm (TE)
WG: 500nm x 220nm
BOX ~2μm & Top Cladding ~2μm

Ring Resonator

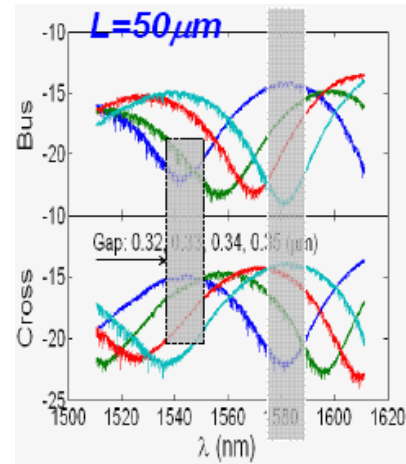
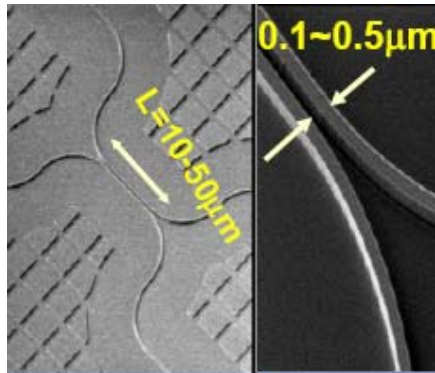


Cross Port (23 Rings)



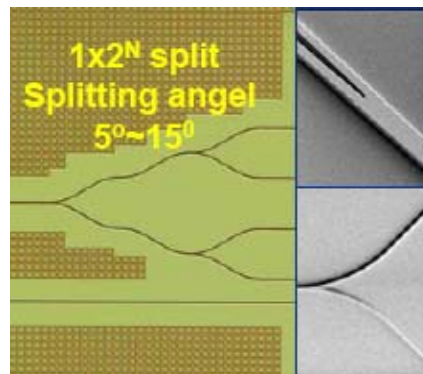
Through & Drop Ports

Direction Coupler

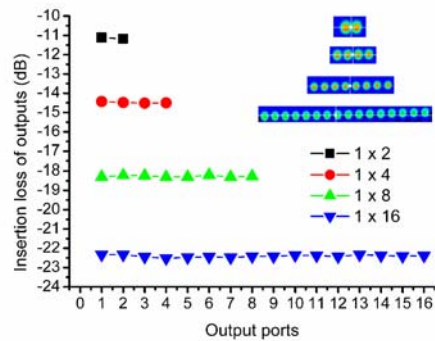


Through & Drop Outputs
Insertion loss ~12dB

Splitter

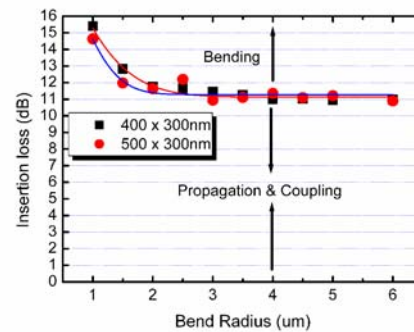
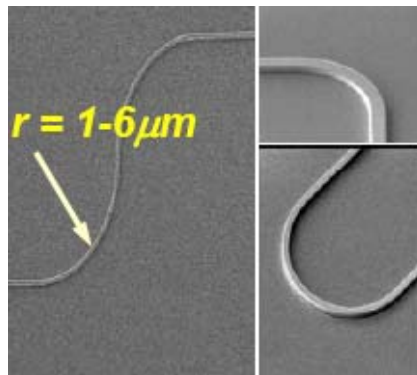


1x2 1x4 1x8 1x16



Splitters:
1x2, 1x4, 1x8, 1x16

Bend



$R=1 \mu\text{m}$, $\sim 0.31\text{dB}/90^\circ$ turn
 $R=2 \mu\text{m}$, $\sim 0.11\text{dB}/90^\circ$ turn
 $R=5 \mu\text{m}$, $\sim 0\text{dB}/90^\circ$ turn