Integrated Photonics

Figures and Images for Instructors

Module 4

Dielectric and Polymer Waveguides and Waveguide Devices

Optics and Photonics Series

OP-TEC
National Center for Optics and Photonics Education

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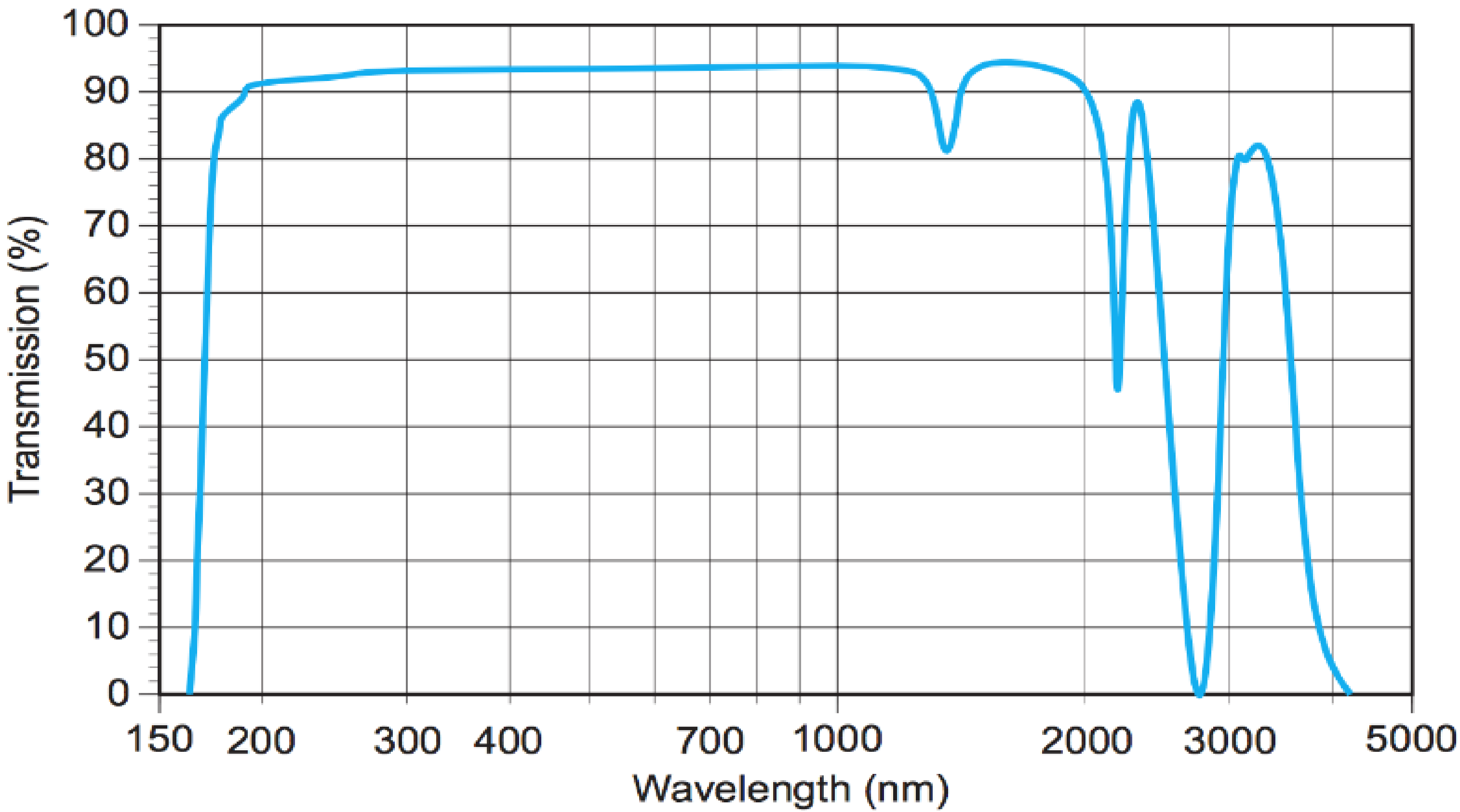


Figure 4-1 *Fused silica glass percent transmission vs. wavelength*

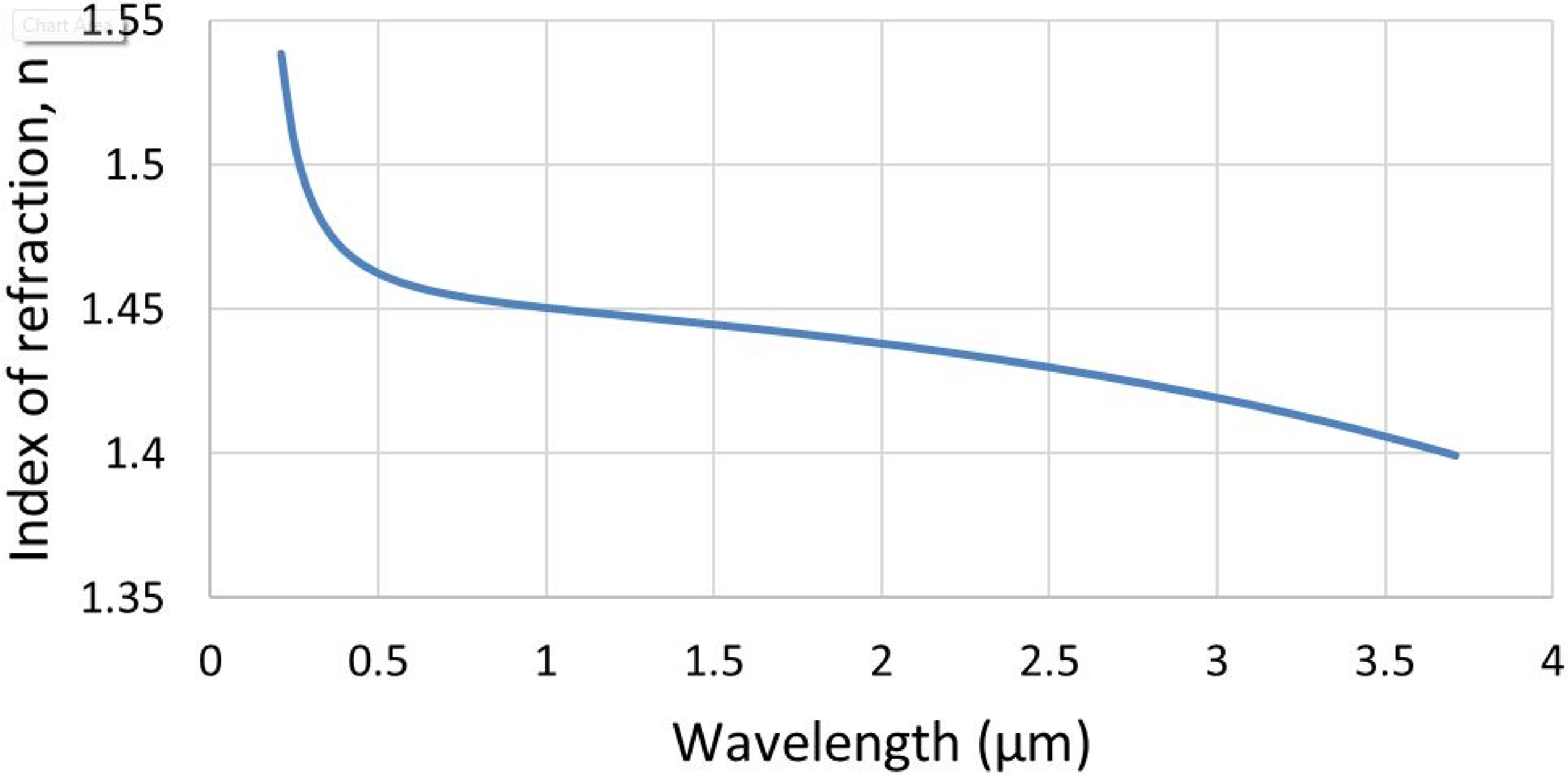


Figure 4-2 *Index of refraction of glass vs. wavelength*

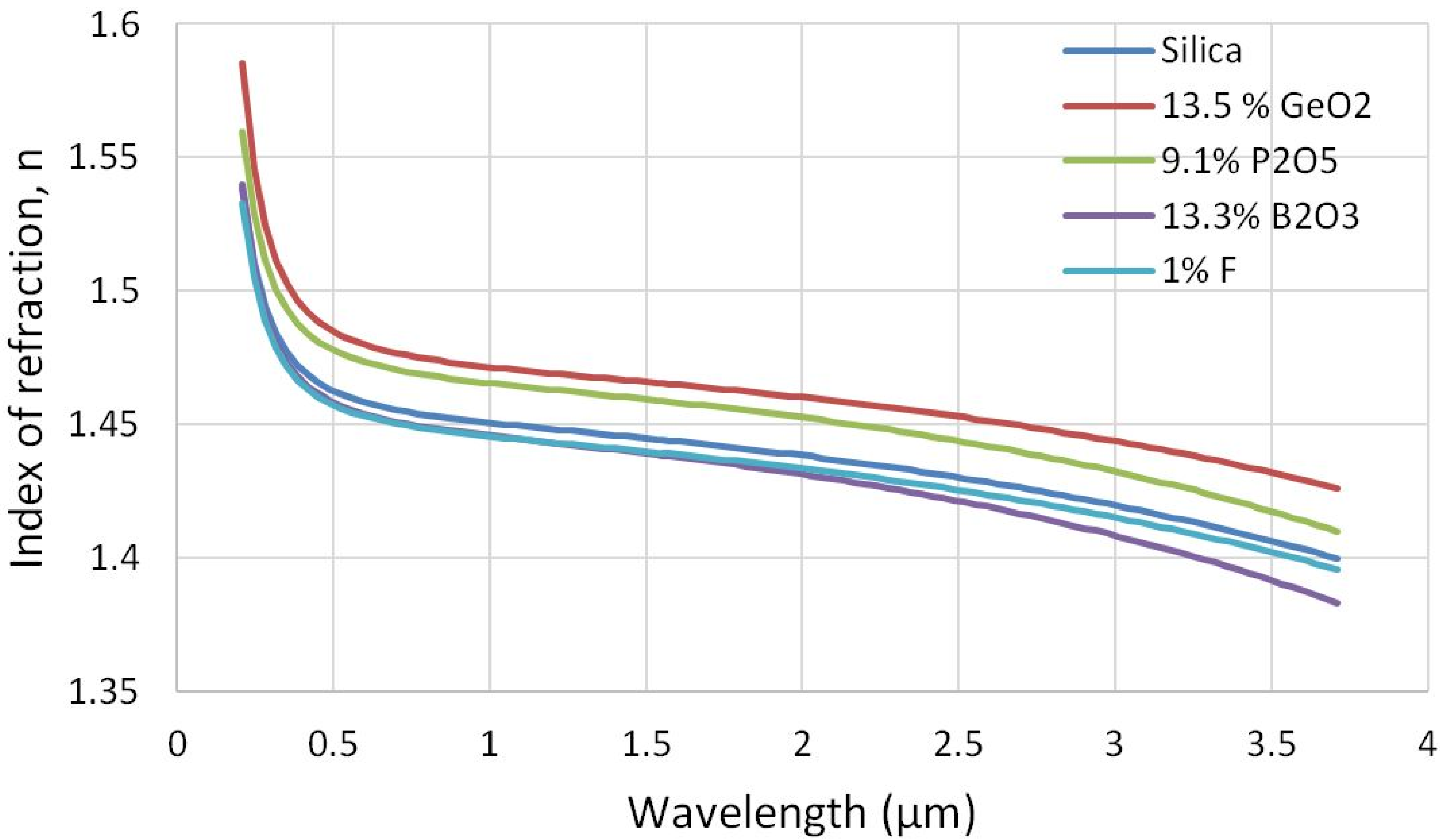


Figure 4-3 *Index of refraction of silica and doped silica vs. wavelength*

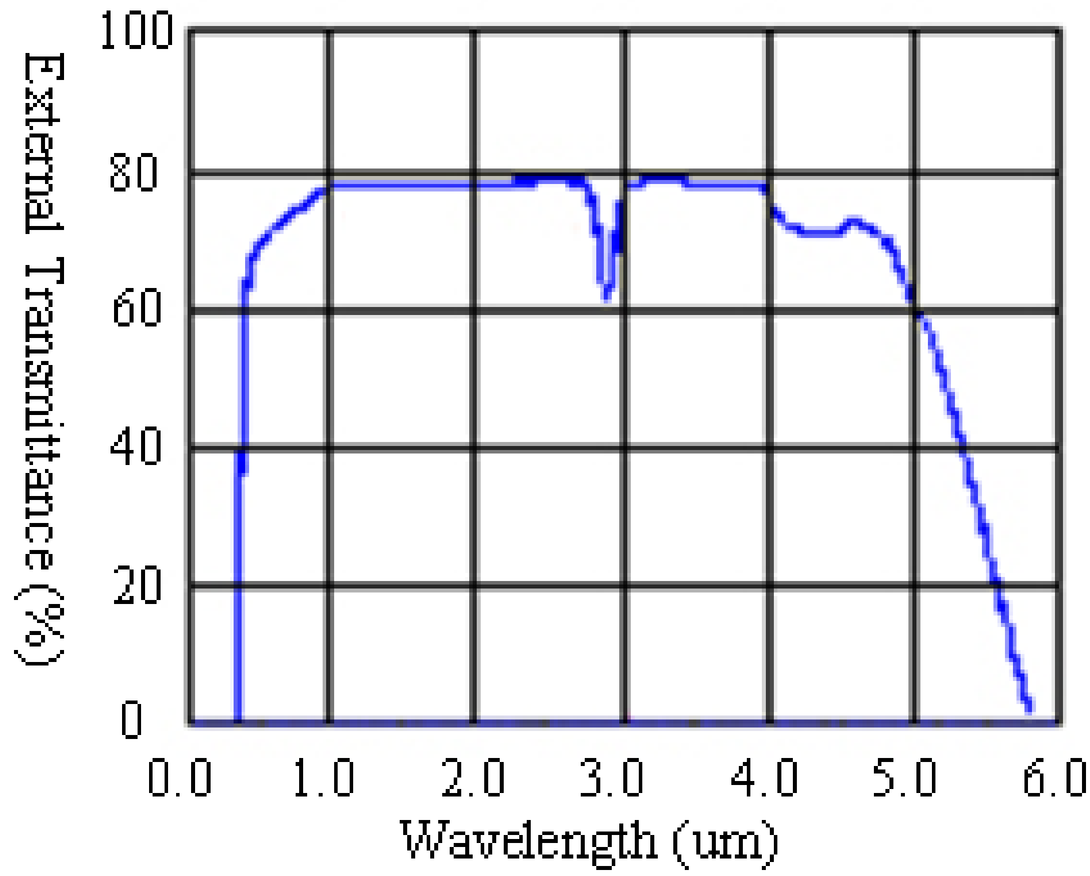


Figure 4-4 *Percent transmission vs. wavelength for lithium niobate*

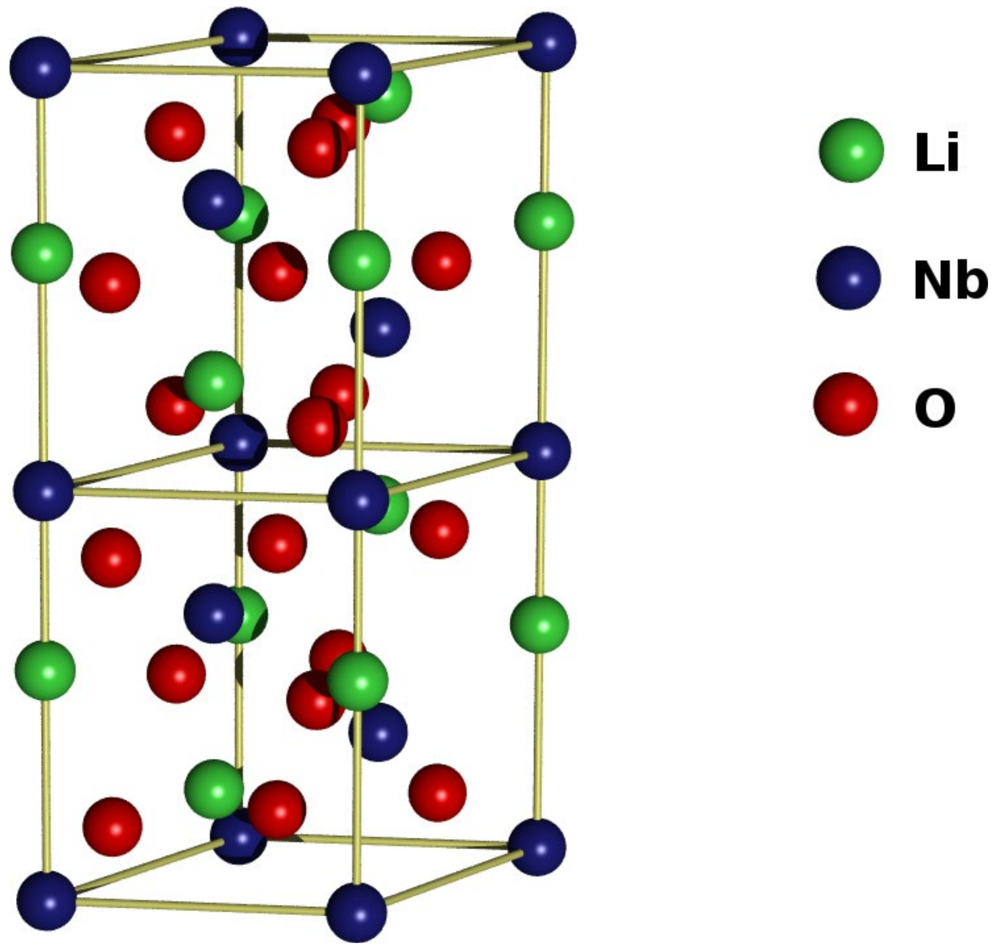


Figure 4-5 *Crystal structure of lithium niobate*

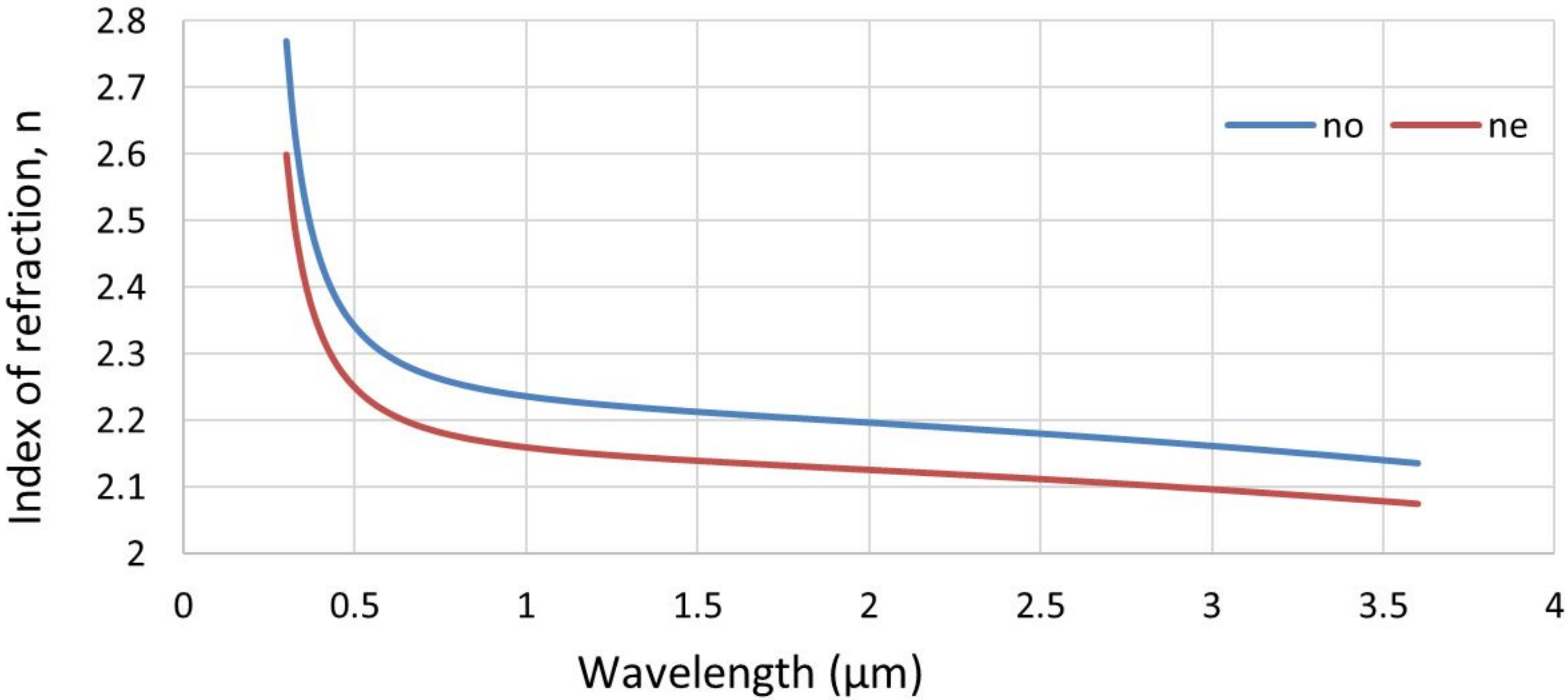


Figure 4-6 *Ordinary and extraordinary indices of refraction of lithium niobate vs. wavelength*

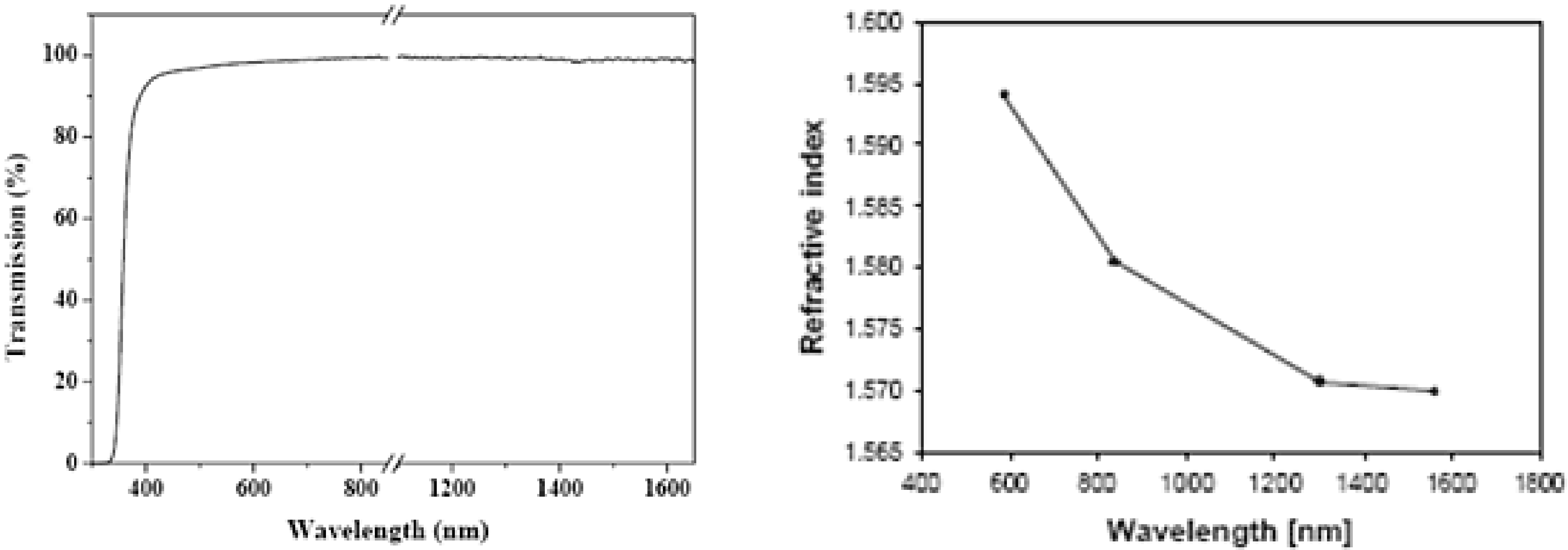


Figure 4-7 *Percent transmission and index of refraction of SU-8 vs. wavelength*

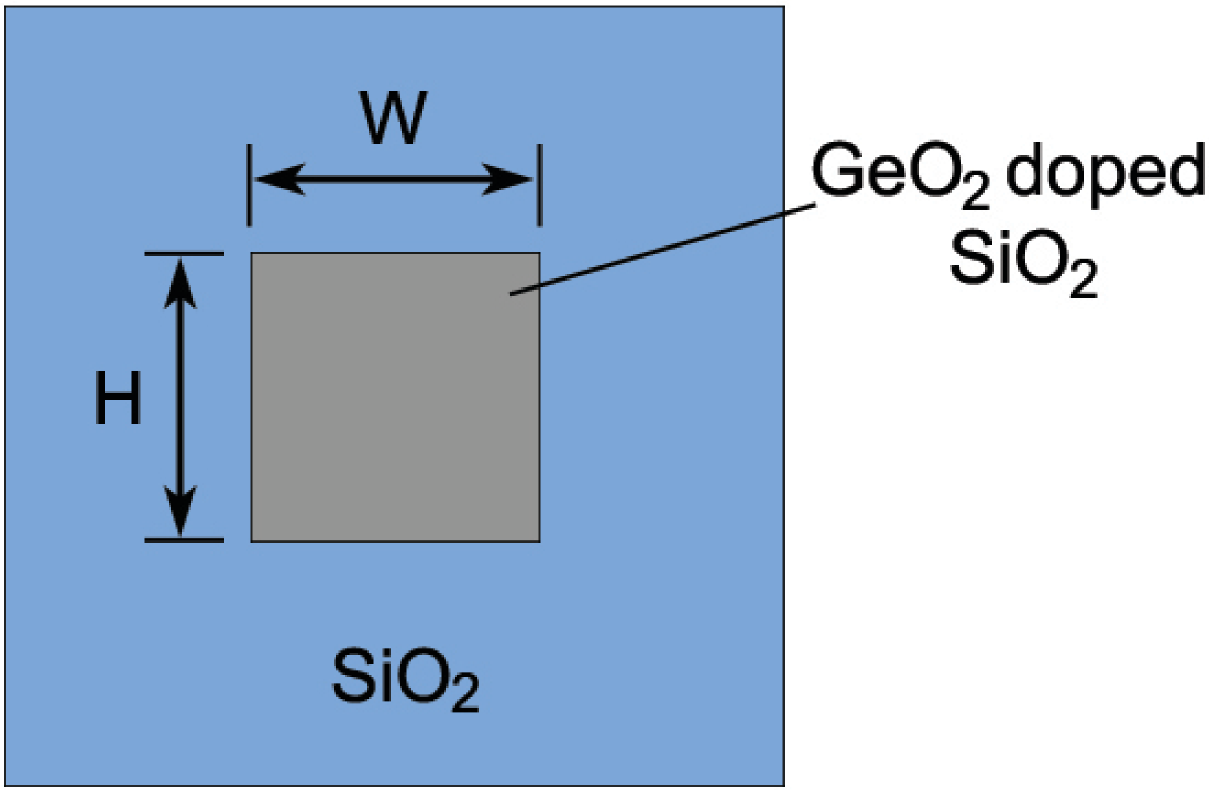


Figure 4-8 *Silica-on-silicon buried channel waveguide*

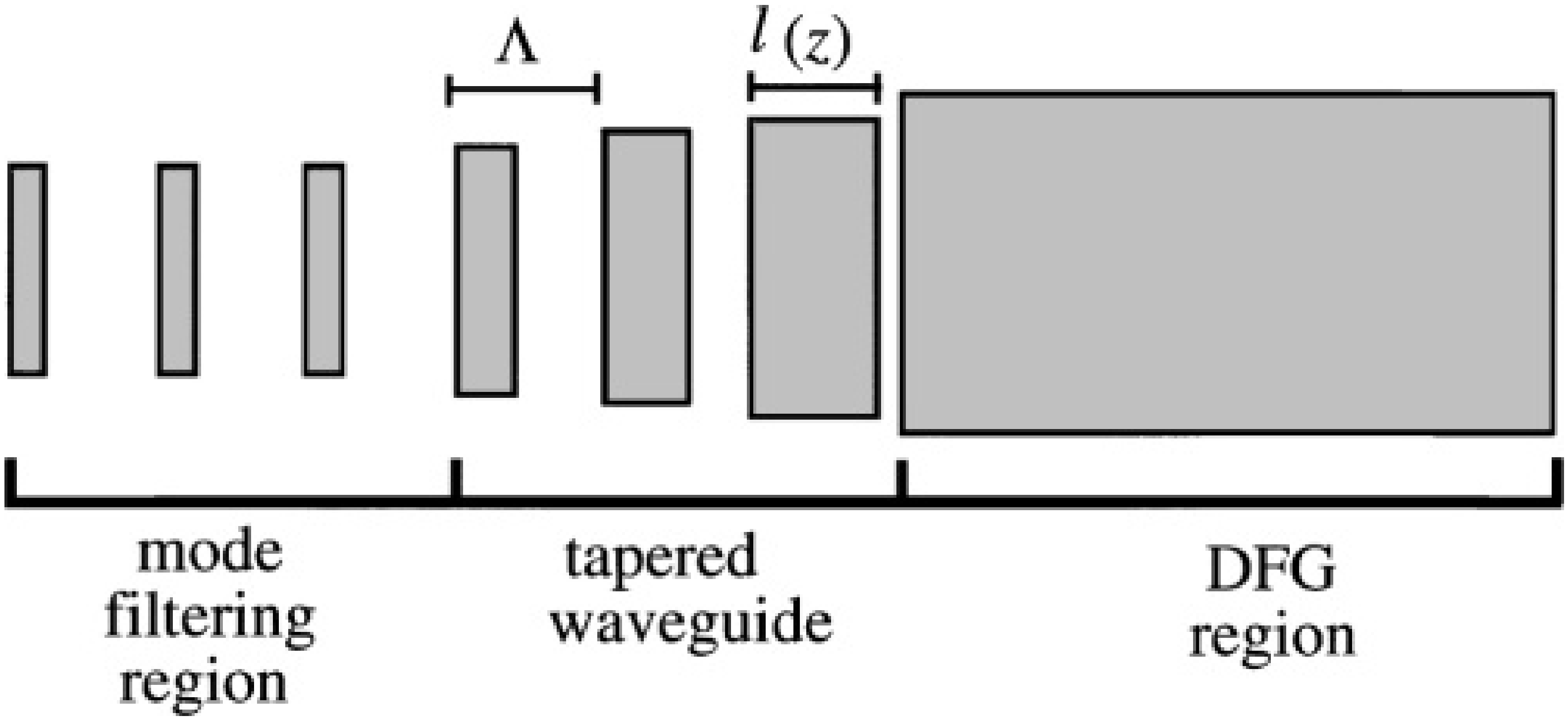


Figure 4-9 *Periodically segmented waveguide taper*

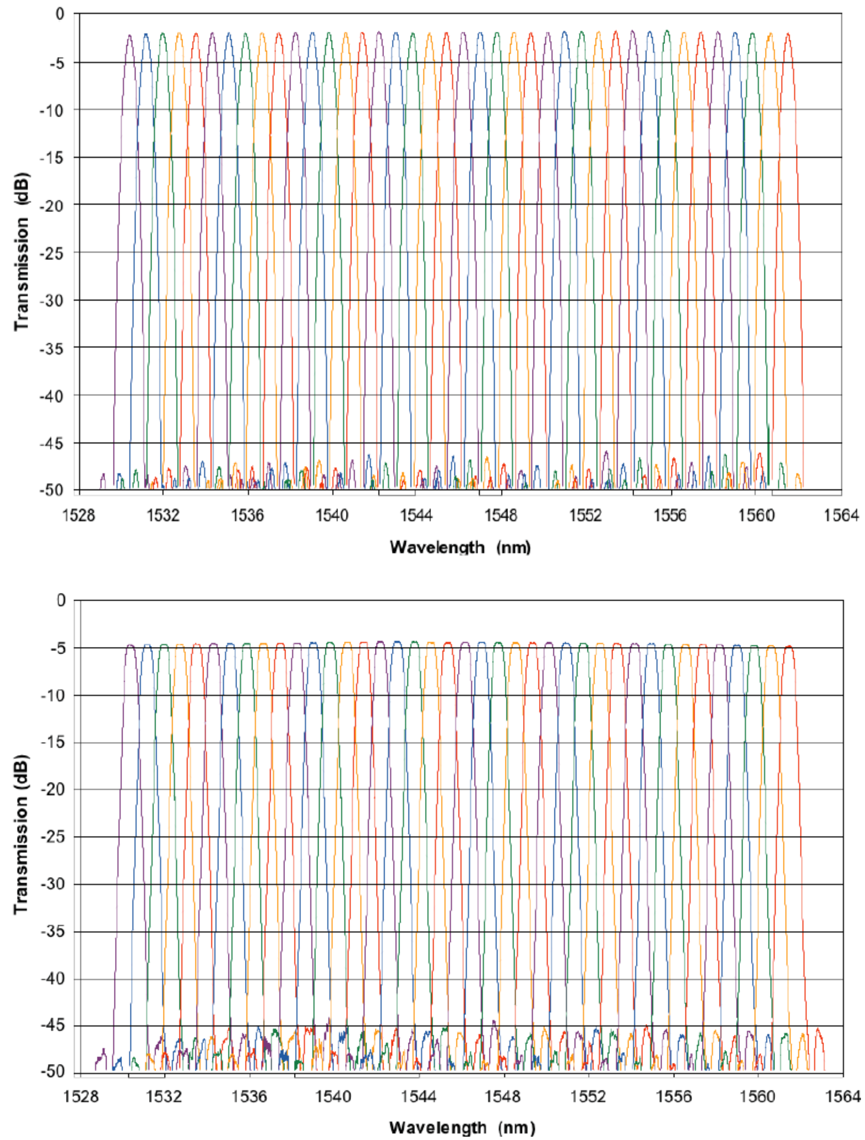


Figure 4-10 *Top: Spectrum of Gaussian AWGs; Bottom: Spectrum of flat-top AWGs*

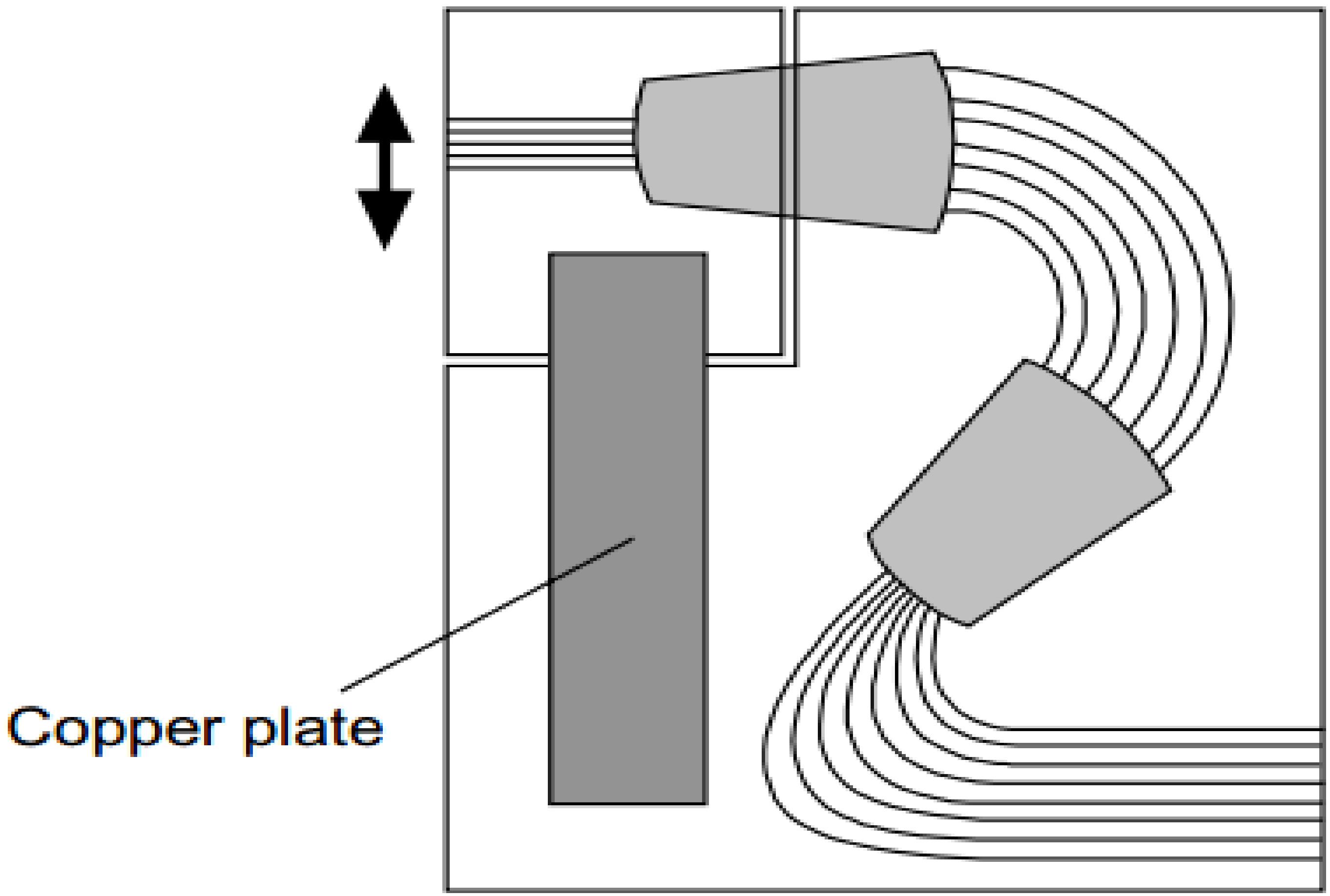


Figure 4-11 *Athermal AWG based on mechanical control*

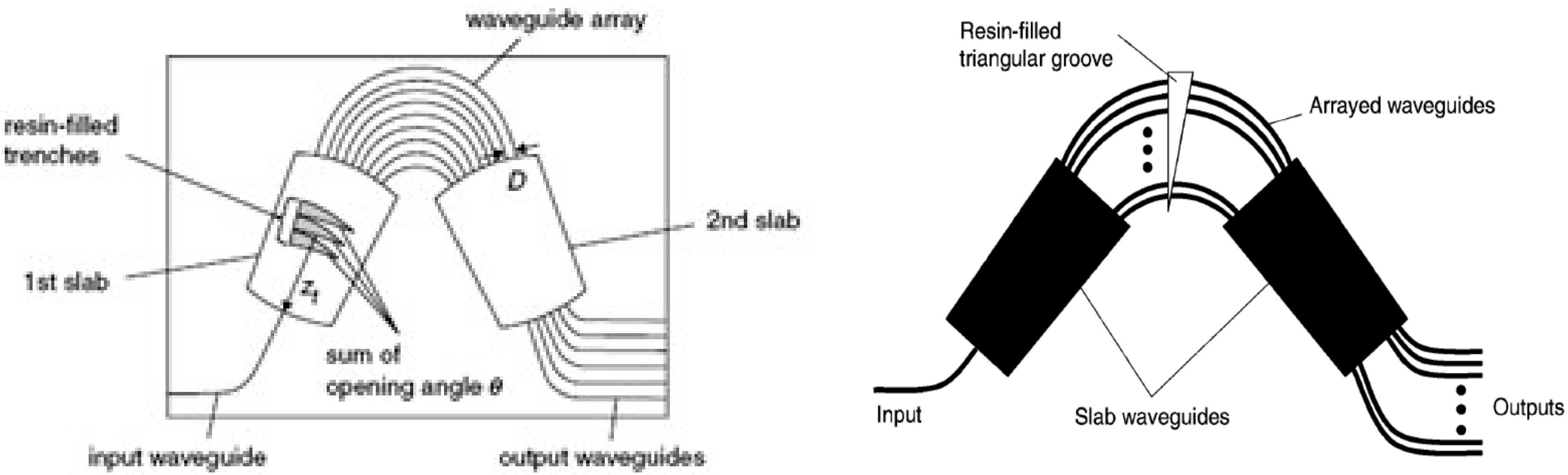
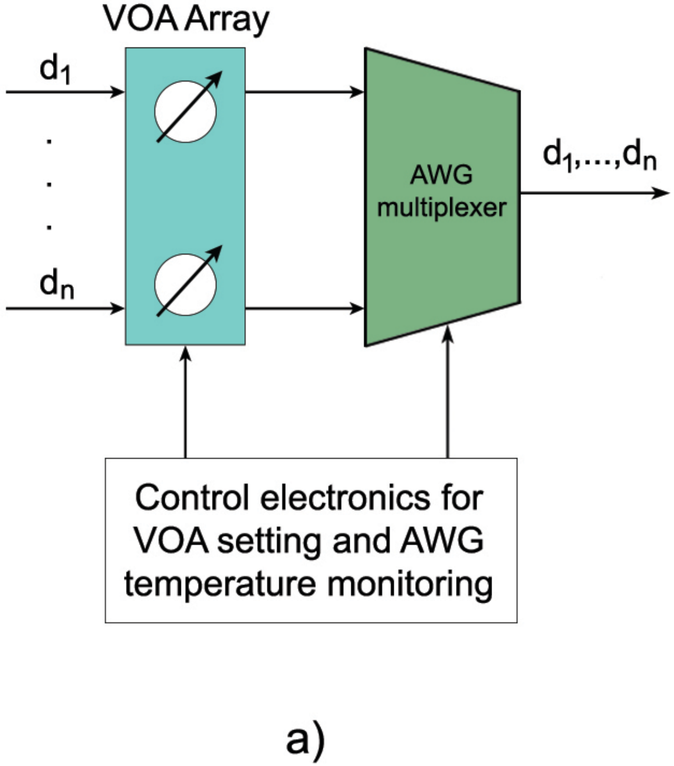


Figure 4-12 *Athermal AWG based on refractive index control*



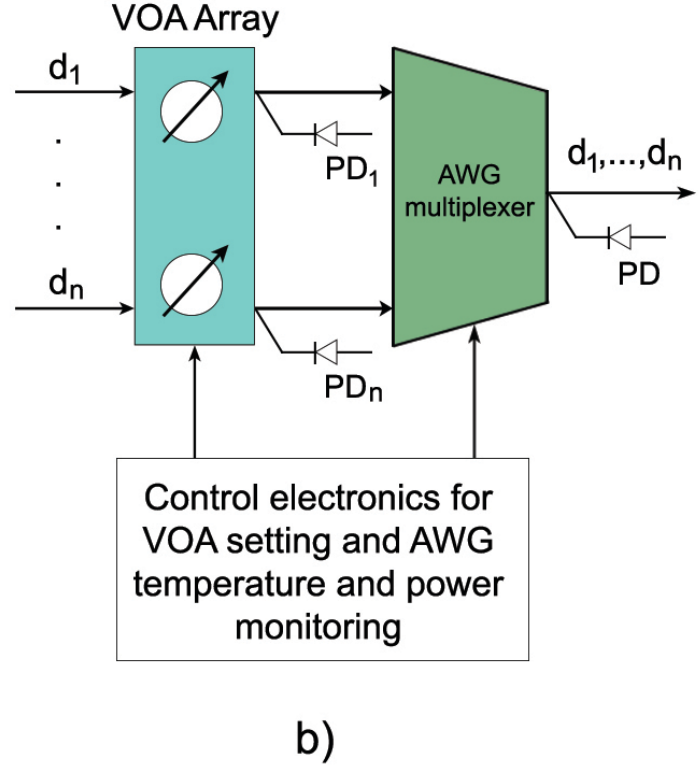


Figure 4-13 a) *VMUX device*

Figure 4-13 b) *VMUX with optical power monitoring*

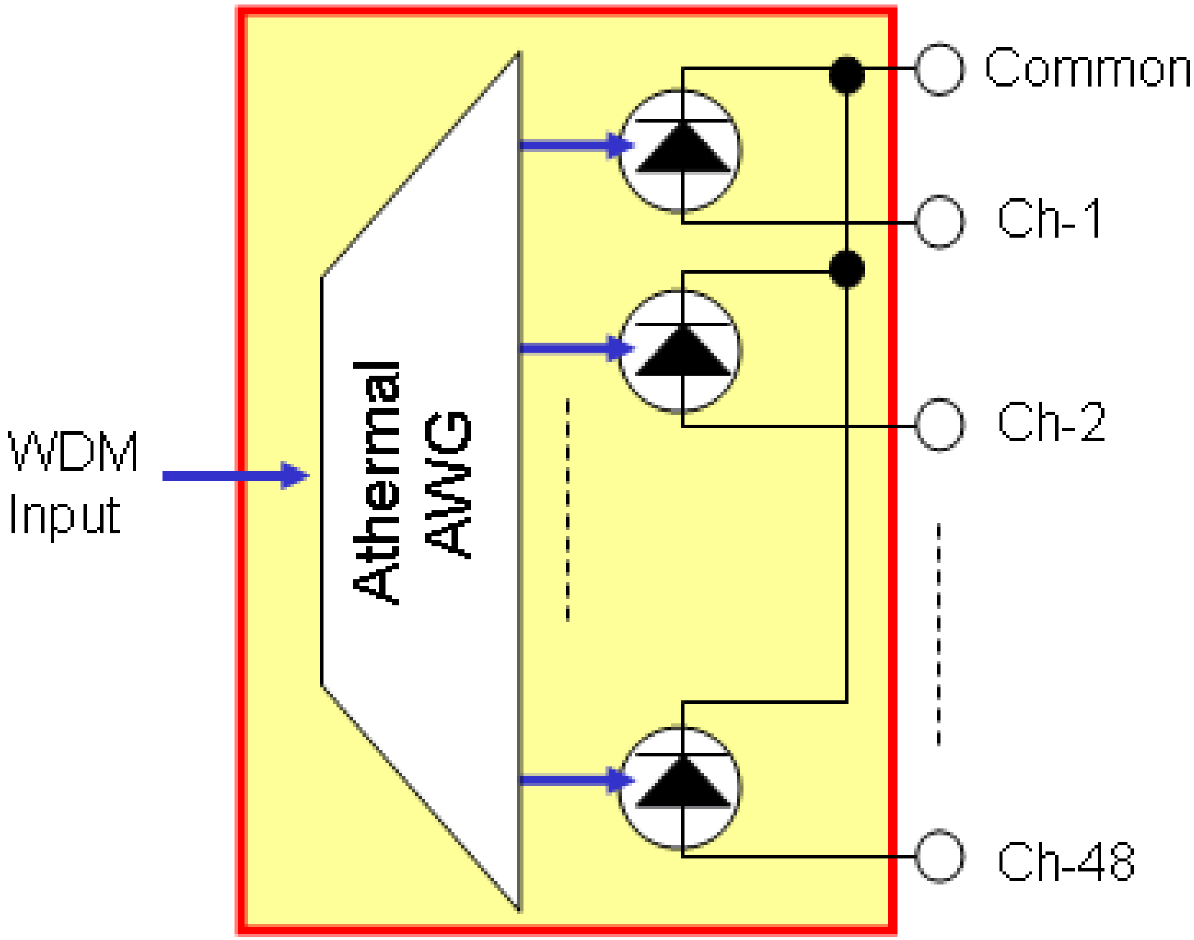


Figure 4-14 *Optical channel monitoring of 48 channels using an athermal AWG*

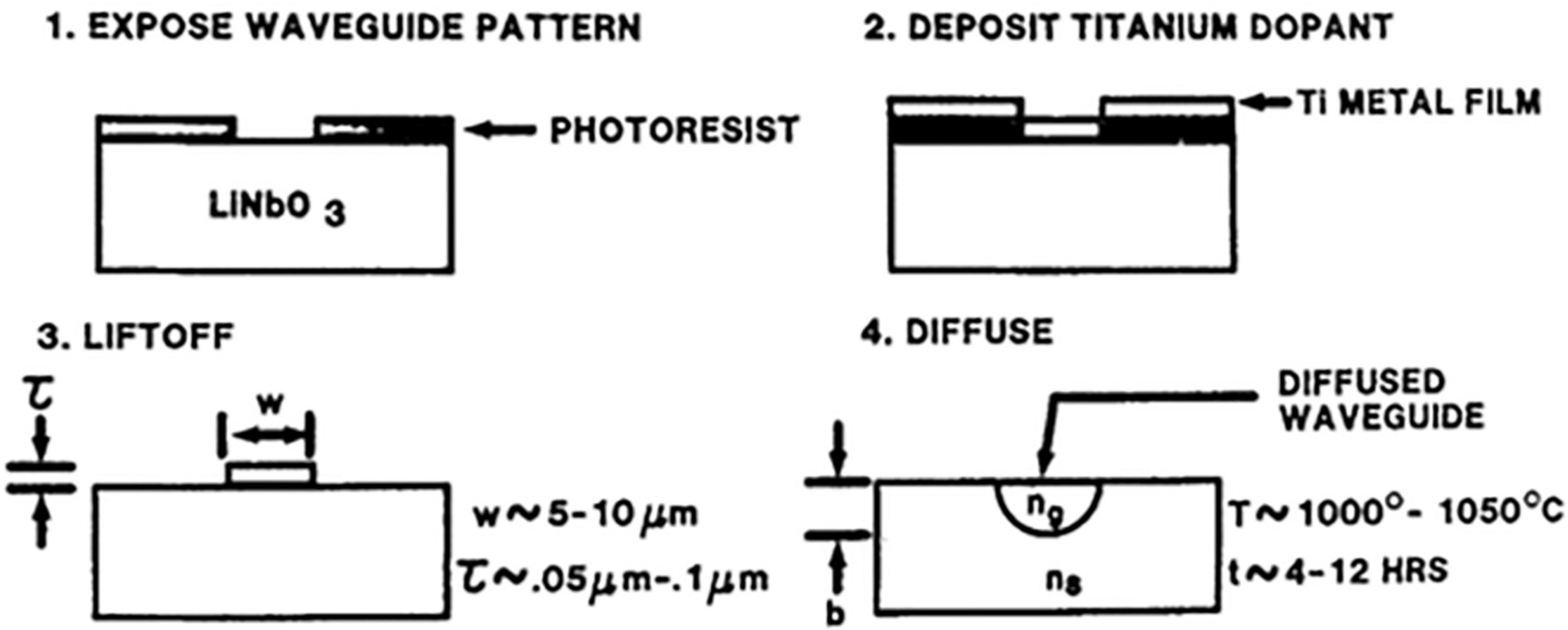


Figure 4-15 *Titanium diffused lithium niobate waveguide*

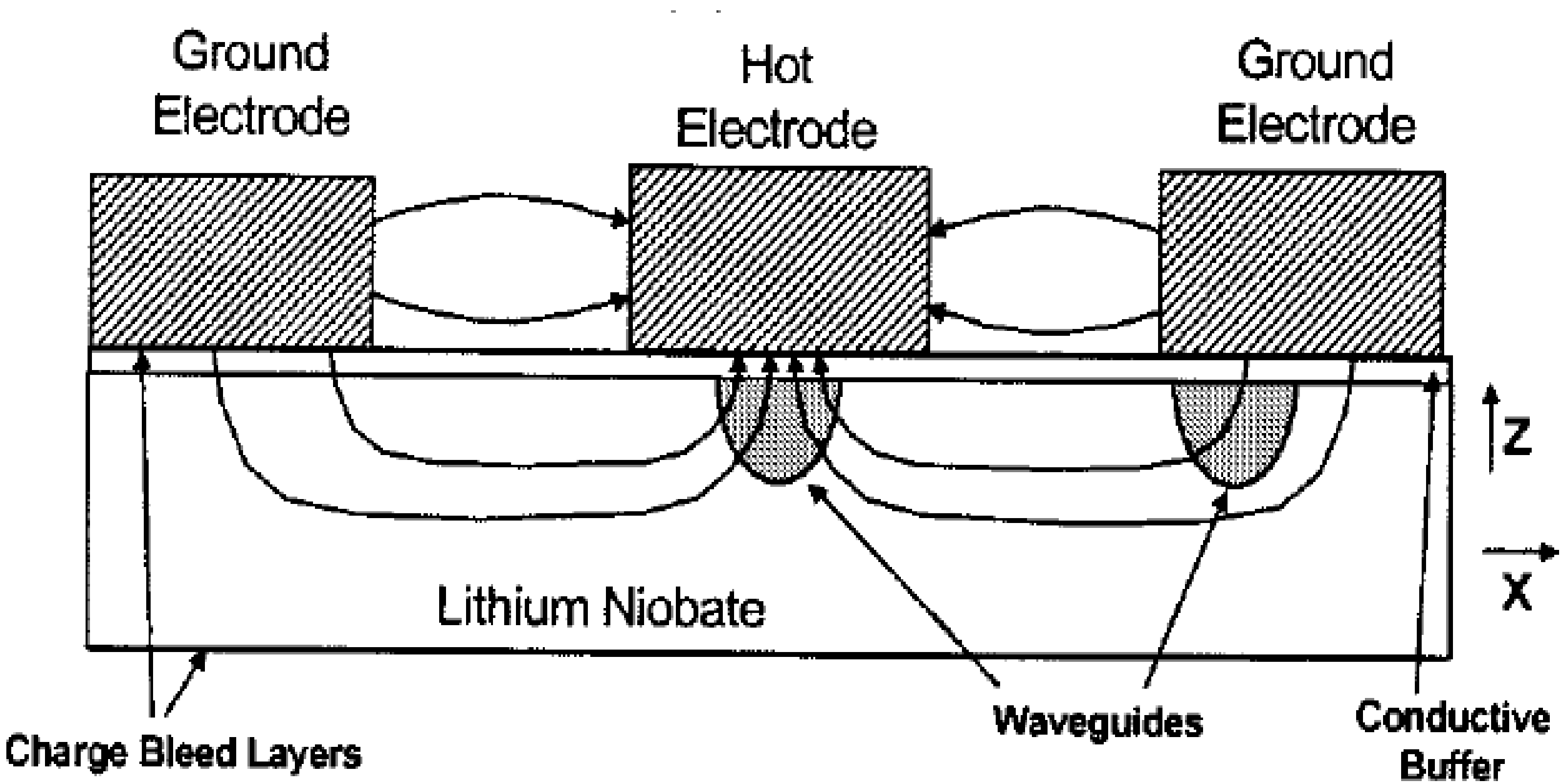


Figure 4-16 *Electrode configuration for MZI lithium niobate modulator*

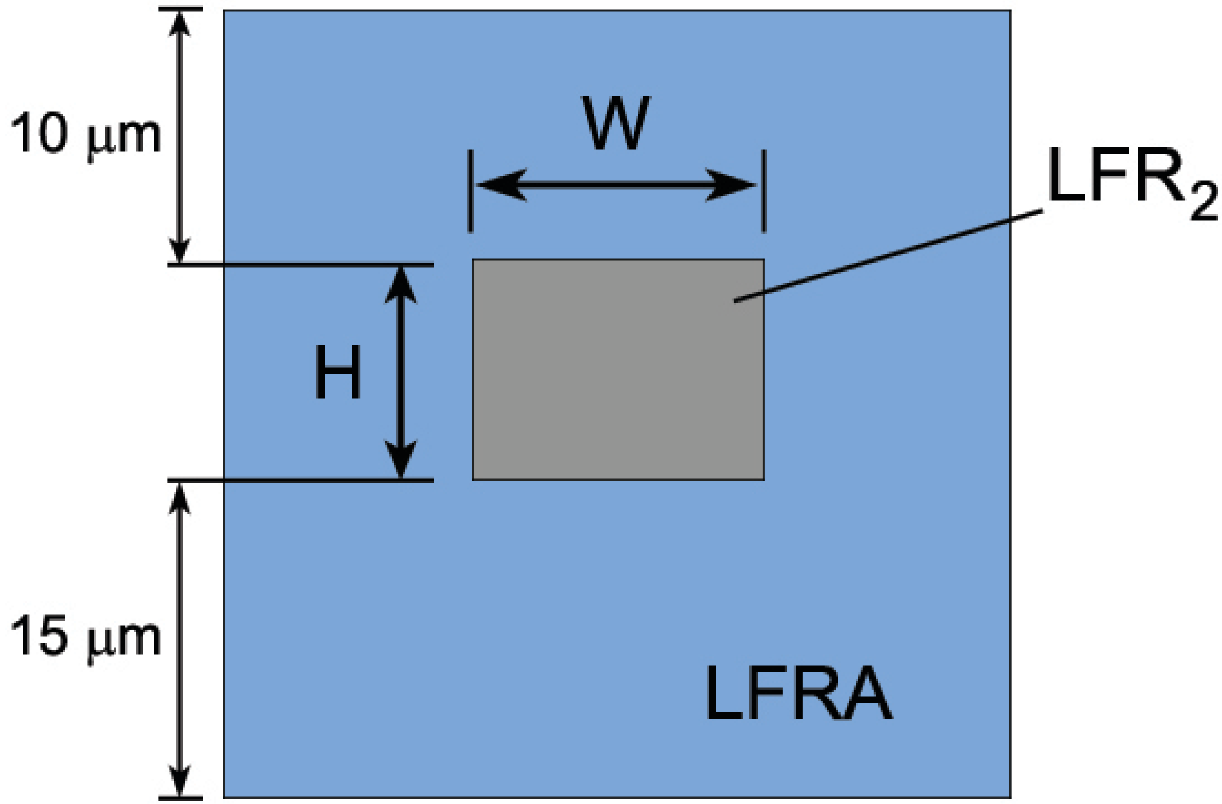


Figure 4-17 *Polymer buried channel waveguide*

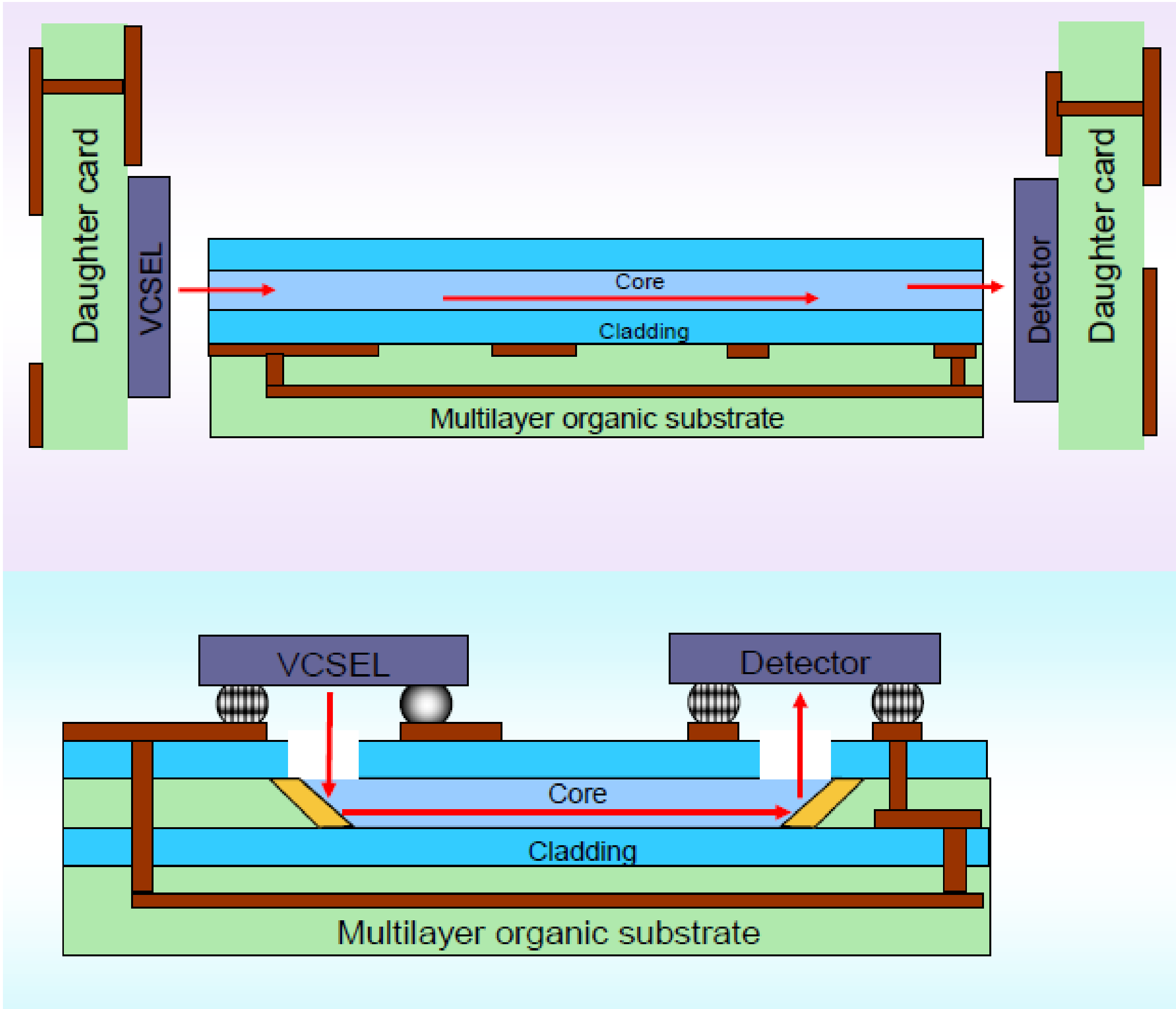
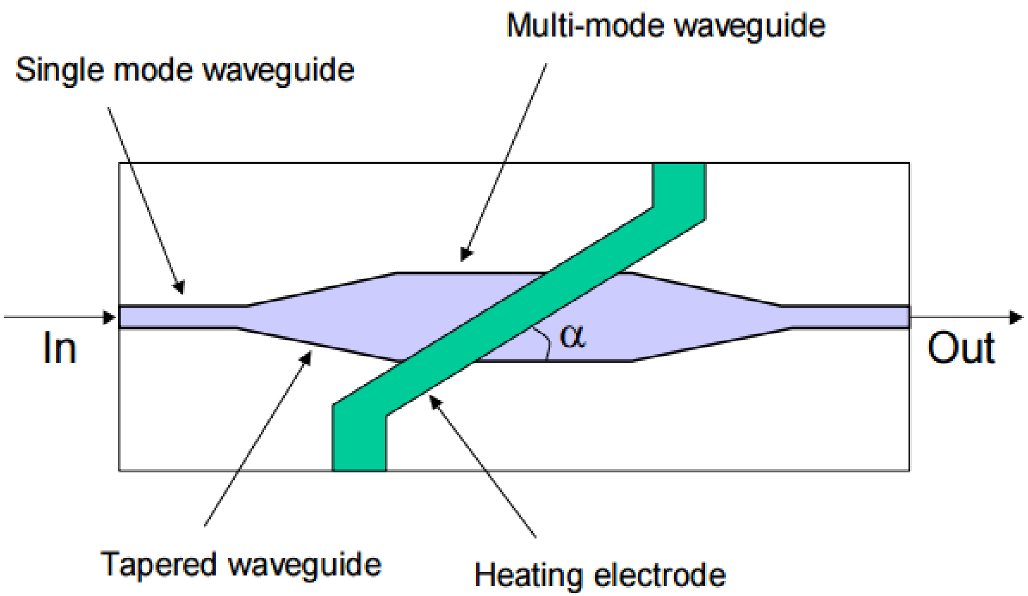
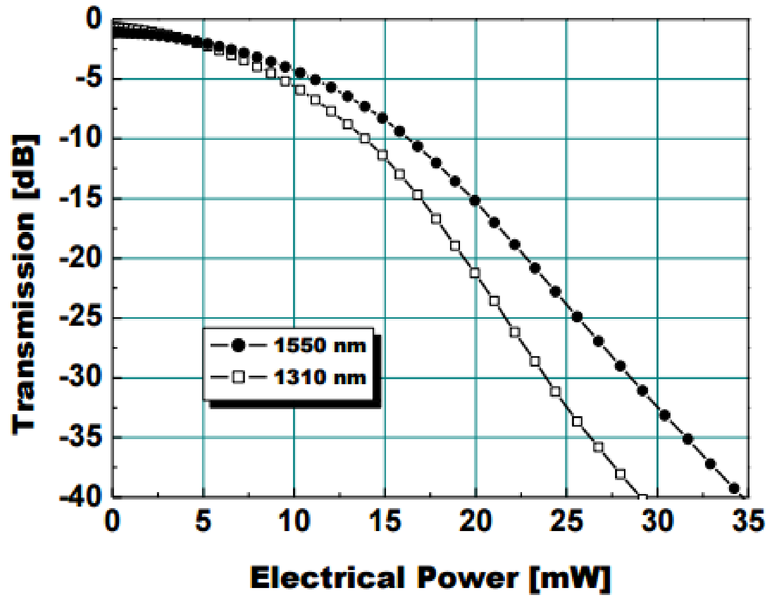


Figure 4-18 *Polymer waveguide connecting a VCSEL laser and a photodetector. Top: in-plane interconnection. Bottom: out-of-plane connection using 45^o mirrors.*

Figure 4-19 *Silicone waveguides for optical interconnects. Courtesy of Dow Corning.*



(a)



(b)

Figure 4-20 a) *Polymer multimode waveguide-based VOA*

Figure 4-20 b) *VOA transmission vs. applied electrical power for the wavelengths of 1.31 μm and 1.55 μm*

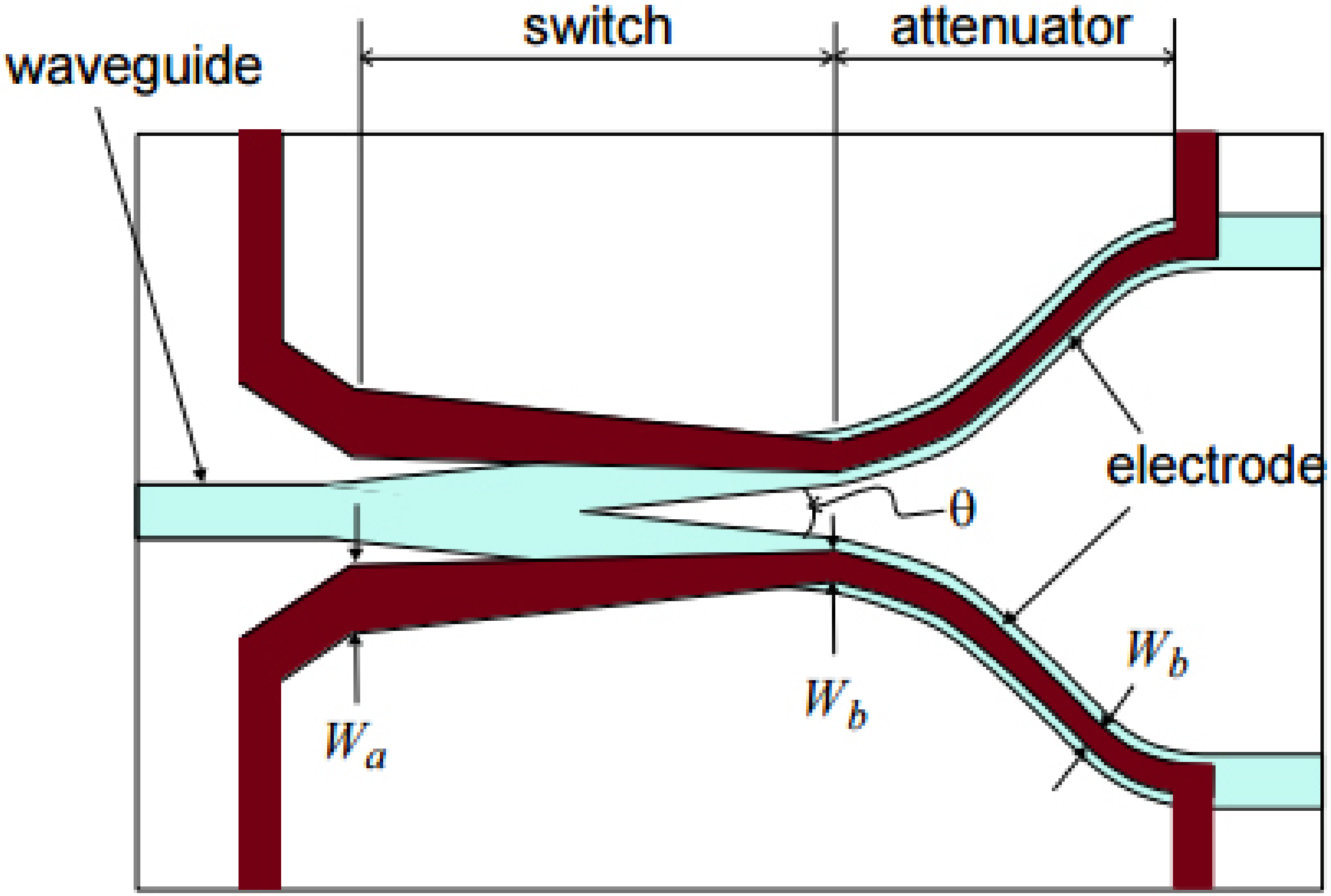


Figure 4-21 *Digital optical switch*

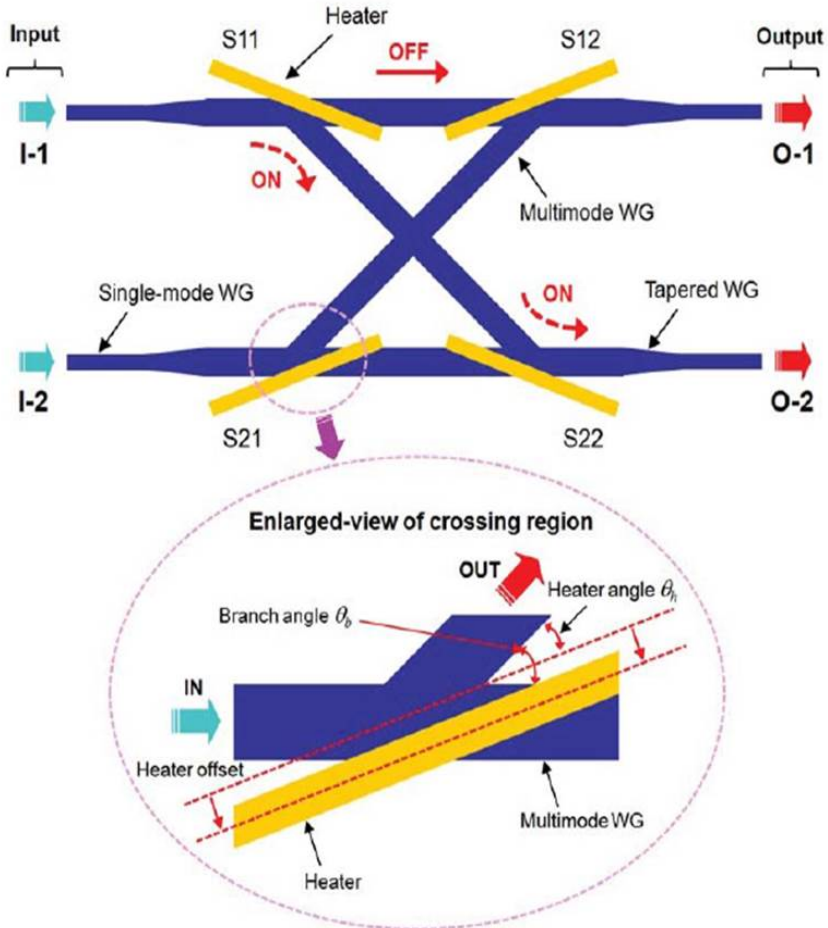
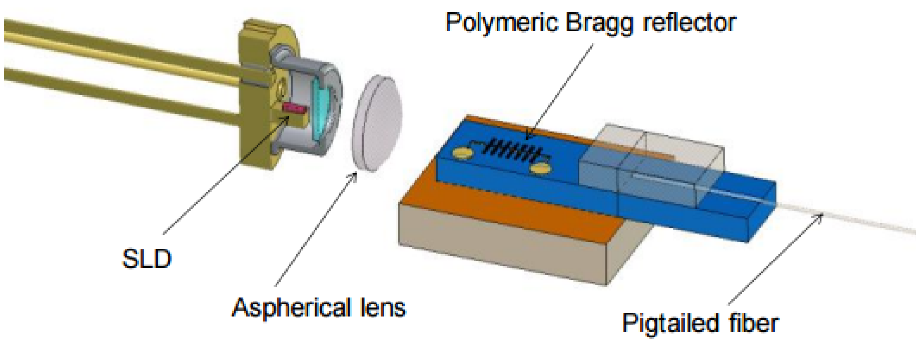
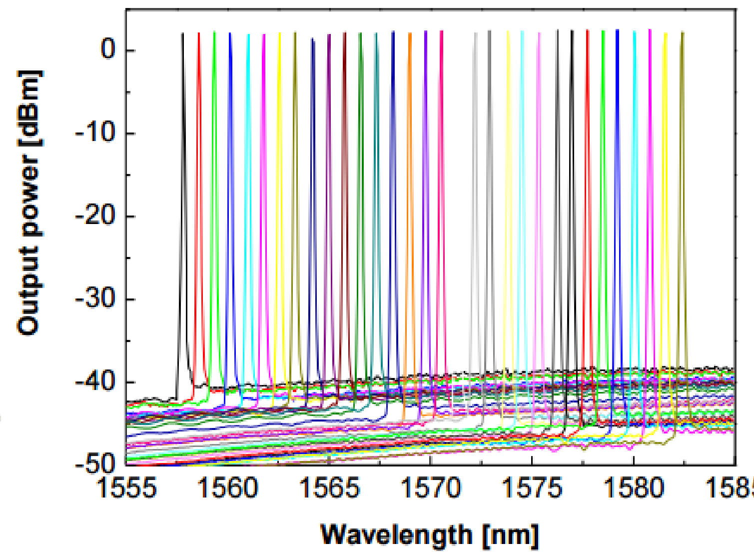


Figure 4-22 *2 x 2 polymer digital optical switch*



(a)



(b)

Figure 4-23 a) *Laser configuration of a tunable wavelength laser with a polymer Bragg grating*

Figure 4-23 b) *Output power emitted by the tunable wavelength laser with a polymer Bragg grating*

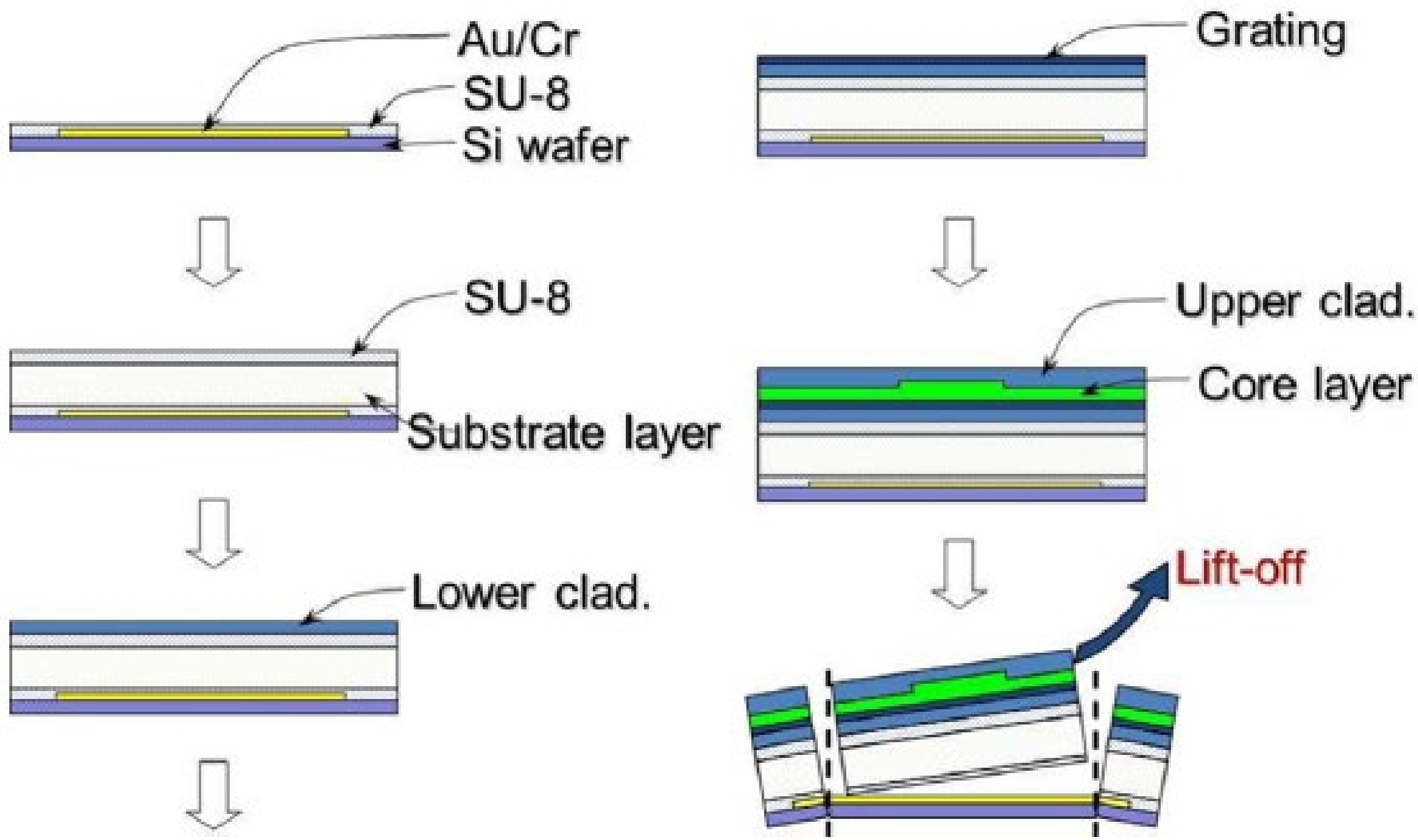


Figure 4-24 *Fabrication process for polymer strain sensor*

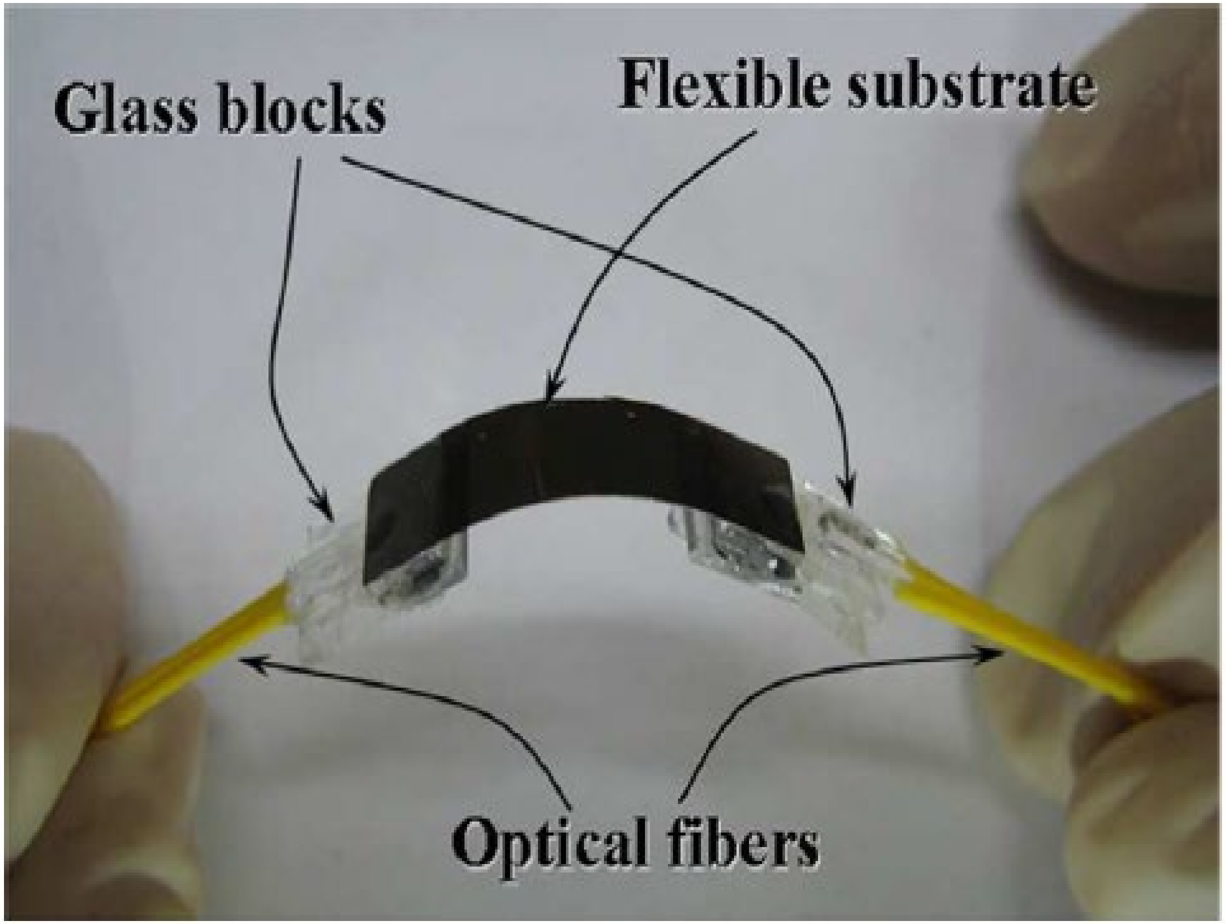


Figure 4-25 *Strain sensor based on polymer waveguide grating*