

Abstract Submitted
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Nanowire Photonic Circuit Elements ANDREW GREYTAK, Department of Chemistry and Chemical Biology, Harvard University, CARL BARRELET, Department of Chemistry and Chemical Biology, Harvard University, CHARLES LIEBER, Department of Chemistry and Chemical Biology and Division of Engineering and Applied Sciences, Harvard University — We report an approach for guiding and manipulating light on sub-wavelength scales using active nanowire waveguides and devices. Semiconducting nanowire structures are distinct from conventional transparent dielectric waveguides since absorption and emission occur for modes with near band edge energies. Quantitative studies show that light propagation in nanowire structures takes place with only moderate losses through sharp and even acute angle bends. The losses measured are compared to those reported recently for photonic crystal structures and plasmon waveguides. Furthermore, a straightforward nanowire based electro-optic modulator (EOM) was demonstrated. The EOM has been shown to yield a substantial field-dependent modulation of the intensity of light propagating through these active waveguides. In addition, an efficient electrically-based injection of light into guided modes of the active nanowire waveguides will be described. Progress towards and challenges for electrical and optical manipulation of light in nanowire waveguides for logic will be discussed.

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