

Public Abstract

First Name:Venumadhav

Middle Name:Reddy

Last Name:Korampally

Adviser's First Name:Shubhra

Adviser's Last Name:Gangopadhyay

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:A NOVEL ULTRA-LOW REFRACTIVE INDEX NANOPOROUS DIELECTRIC
BASED AQUEOUS CORE LIGHT WAVEGUIDE SYSTEM

This dissertation presents the fabrication of an on-chip waveguide system capable of guiding light through aqueous solutions. The waveguide relies on total internal reflection for light propagation wherein the core of the waveguide consists of the aqueous solution. The relatively low refractive index of aqueous solutions places a serious constraint on the choice of the cladding materials. Nanoporous dielectric materials are engineered to be low refractive index by packing nano sized voids within a matrix material. This research presents development of high quality optical coatings of nanoporous dielectrics and their integration to the chip based aqueous core waveguide systems. Such waveguides are of great interest in biosensor design as water is the natural medium for any biological processes.