Ultraviolet transparent silicon oxynitride waveguides for biochemical microsystems - DTU Orbit (11/12/2018)

**Ultraviolet transparent silicon oxynitride waveguides for biochemical microsystems**

The UV wavelength region is of great interest in absorption spectroscopy, which is employed for chemical analysis, since many organic compounds absorb in only this region. Germanium-doped silica, which is often preferred as the waveguide core material in optical devices for telecommunication, cannot accommodate guidance below 400 nm, owing to the presence of UV-absorbing centers. We show that silicon oxynitride (SiOxNy) waveguides exhibit very good UV performance. The propagation loss for 24-mum-wide SiOxNy waveguides was found to be similar to 1.0 dB/cm in the wavelength range 220-550 nm. The applicability of these waveguides was demonstrated in a biochemical microsystem consisting of multimode buried-channel SiOxNy waveguides that were monolithically integrated with microfluidic channels. Absorption measurements of a beta-blocking agent, propranolol, at 212-215 nm were performed. The detection Limit was reached at a concentration of 13 μM, with an optical path length of 500 mum (signal/noise ratio, 2).

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