Photosensitive post tuning of chalcogenide photonic crystal waveguides

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Post tuning of the properties of individual photonic crystal component is highly attractive, not only to relax the fabrication tolerances but also to allow individual components to be optimized for different environments or tasks.

We demonstrate a novel post-process tuning technique through the photosensitivity of chalcogenide glass to modify the optical properties of a planar photonic crystal device. Chalcogenide glasses are known for their large photosensitivity enabling the creation of directly written waveguides and strong Bragg gratings. Post-tuning of distributed feedback lasers and quantum cascade laser [1] has been achieved by employing this photosensitivity. Here, we use the photosensitivity of AMTIR-1 chalcogenide glass to modify the optical properties of a photonic crystal waveguide. A W1 PhC waveguide was exposed to 633nm light at an intensity of 1.3W/cm^2. The resulting change in the dispersion of the modes of the waveguide was detected *in situ* using an evanescent probing technique [2], which yielded a shift of 5 nm in the wavelength for resonant coupling. We show that the photoinduced change in the photonic crystal grows and saturates with increasing exposure.

[1] M. Shokooh-Saremi, et al, Electronics Lett. **41**, 13-14 (2005).
[2] S. Song, et al, App. Phys. Lett. **89**, 041115 (2006).