Optical data transmission is one of today’s key technologies with solid state laser systems being one of its most important components. The commonly used laser systems are based on (inorganic) semiconductor diodes, which are mode stabilized using distributed feedback (DFB) structures. Generally, lasers based on the DFB principle operate at a single fixed wavelength. Tunability of the laser wavelength would, however, be a desirable feature for e.g. multiplexing. Organic materials as the active component in solid state laser devices have received some attention of late. This is mainly due to the ease of processing these materials, which allows for solution processing (spin coating or printing), and their mechanical flexibility, which has been exploited to achieve flexible, however not tunable, laser resonator structures.

We employ a novel elastomer that bears photo-reactive thiocyanate (-SCN) groups. These groups undergo a photo-induced isomerization to iso-thiocyanate (-NCS) under UV irradiation. This isomerization engenders an increase of the refractive index of the bulk material. Using interference lithography, we are able to inscribe refractive index gratings into a film of the material. With an organic laser dye as the active medium optically pumped lasers are fabricated. Elongating the structure leads to a change of the grating period with ensuing change of the emission wavelength. This allows for a continuous tuning of the laser wavelength over a spectral region of 25 nm.