

## Optical Fuse

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We report an optical control of a waveguide in a liquid crystal. Our sample consists of a Cr grating structure infiltrated with a nematic liquid crystal. They are sandwiched between two quartz substrates as shown in the figure. An incident CW laser is coupled to the waveguide formed between substrates by the optical resonance of the Cr grating. The index of refraction of the liquid crystal is modified by the incident CW light via the heat generation from the Cr grating. A large shift, more than 50 nm in wavelength, is observed. There is an excellent agreement between numerical calculations based on the scattering matrix and observed optical shifts. Its response time is in sub-second. Modification of the sample structure, e.g. a thinner liquid crystal thickness, will be discussed. Finally, we will propose that this mechanism could be applied as a spontaneous switch, a miniaturized and reconfigurable optical fuse.

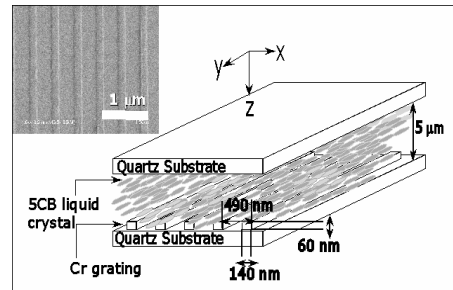


Figure: A schematic of the sample. Gray bar represent the local alignment of liquid crystal.