Fast response wavelength tunable filter using VA-PSLC with a Curing Voltage

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We present experimental results obtained for a Vertically-Aligned Polymer Stabilized Liquid Crystal (VA-PSLC), also known as liquid crystal gel, with a curing voltage. The curing voltage was found to help reduce the otherwise strong scattering effect of the VA-PSLC. This liquid crystal (with birefringence = 0.09) was placed inside a Fabry-Perot cavity to achieve a wavelength tunable filter. For a curing voltage of 2V, the wavelength was found to be ~ 30nm for visible light region of around 633nm with an operation voltage of about 15V. Wavelength tuning range was found to decrease as the curing voltage increased, which is consistent with what we expected since molecules were already tilted at a large angle when the curing voltage was high. Shortening of response time (~ 8X to 10X) was found since the polymer network helped improve the response speed. These filters can have potential applications in wavelength tuning applications (e.g. WDM) in telecommunication systems where high speed is desirable.

References:

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