

filter functions are possible, including high-pass, low-pass, bandpass, notch and dichroic elements. Applications include Raman edge filters for maximising laser rejection by elastic tuning, as well as graded photonic bandgap systems useful for adjustable negative dispersions for pulse compression. Improvements require control of the creep identified in such systems, through better control of the cross-linking.

4. Conclusion

We have demonstrated the repeatable full color tuning of elastically deformable DBRs across the entire optical spectrum without compromising the peak reflectance. Light reflected from the edge of the deformed DBRs showed polarization rotation, while the center reflection was blue shifted compared to the edge. These effects are caused by multiple reflection of incident light at the edge and localized film thinning at the center of the deformed DBRs.

Future developments will allow acquisition of thickness and curvature data from the elastic DBR to allow extension of this work to the study of inflation of micro-balloons [25]. Such structures also provide prospects for the development of color displays, resonant cavities for tunable lasing, tunable LEDs, and bio-inspired filters/reflectors for security applications. Using chemically cross-linked polyisoprene instead of PSPI should enhance actuation sensitivity and decrease the response time to pressure changes, enabling the development of accurate low-cost optical acoustic sensors.

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