

## Swollen liquid crystal elastomers as artificial muscles

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### Abstrak

We demonstrate, for the first time, the low voltage-driven electromechanical effects in liquid crystal elastomers (LCEs) swollen with low molecular weight liquid crystal (LMWLC). Thin film polydomain (POLY) and monodomain (MONO) LCEs were embedded in a well-known LMWLC, 4-n-pentyl 1-4 cyanobiphenyl 1 (5CB), and introduced between transparent indium tin oxide electrodes with 100 nm separation. Absorbing 5CB into poly and mono LCEs, shape changes were obtained in these materials by application of a small voltage. That is, compared to unswollen LCEs, a dramatic-200 times decrease of the critical fields was found for electromechanical effect in swollen LCEs. The response time when the field was switched on in both poly and mono is below 2s. The result expects the outstanding potential of swollen LCEs as a low powered devices and actuator (e.g artificial muscles)