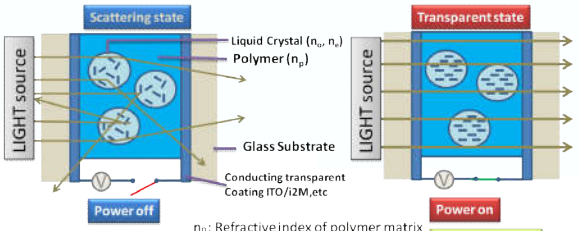
Fog on-demand:
Electrically Switchable Transparency

Principle

- Nano-level phase separation of two soft materials
- Equilibrium state: Light scattering
- Applied electric field switches to a transparent state
- Refractive index tunability

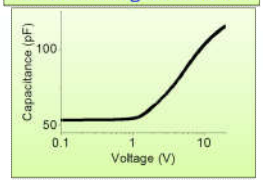


n_o: Refractive index of polymer matrix
n_o: Ordinary refractive index of LC
n_e: Extraordinary refractive index of LC

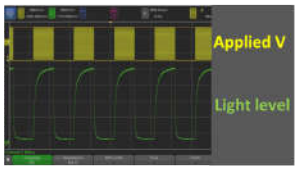
$n_p = n_o \neq n_e$

Polysoft Device — Standard response: Scattering ⟺ Transparent states

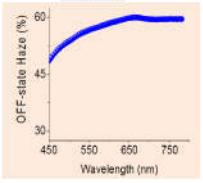
Critical voltage behaviour



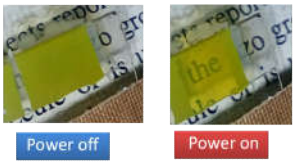
Voltage-dependent Light transmission



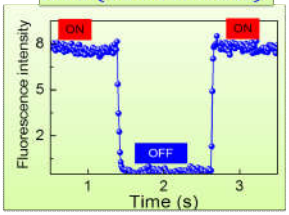
Haze



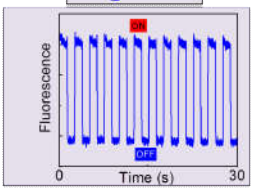
Variation 1: Low fluorescence ⟺ High fluorescence states



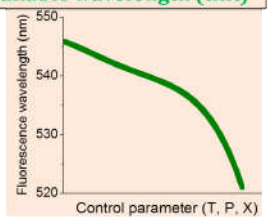
Fast (micro-seconds)



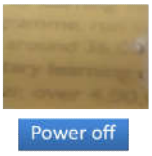
Fatigue-free

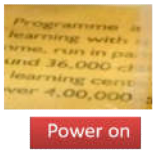


Tunable wavelength (tint)



Variation 2: Incorporation of carbon nanoforms & reduced polymer content





- Threshold voltage halved
- Drastic reduction in driving voltage
- Steeper threshold profile
- Better Greyscale addressing
- Order of magnitude faster switch off

Device parameters	
Threshold voltage	0.4 V
Steepness	55 pF/V
Response time	20 ms

Potential applications

- Sun shading: Automotive glass
- Privacy wall/ Welder's Glass
- RGB pixels in flexible display
- Compatible with low-cost high-transparency electrodes, e.g., i2M
- Compatible with flexible substrates

Exhibit: Polysoft Goggles

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