Interactive liquid crystal polymers for haptics and soft robotics

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We propose the integration of a haptic liquid crystal polymer network (LCN) coating into optical displays, creating a next-generation touchscreen with dynamic haptic feedback (1). This innovative approach bridges optics and haptics, enabling displays to provide real-time tactile sensations through programmable surface deformations. The LCN coating responds to external stimuli such as temperature, light, and electric fields (2), allowing for localized texture changes, friction modulation, and pressure-sensitive feedback. This seamless integration transforms smooth glass surfaces into interactive, touch-responsive interfaces, enhancing user experience in consumer electronics, augmented reality, and assistive technologies. The ability to create programmable tactile patterns makes it ideal for visually impaired users, immersive gaming, virtual training environments, and advanced medical interfaces. By merging haptics with optics, this technology redefines human-machine interaction, paving the way for smarter, more intuitive touch interfaces in the digital age.

Figure 1. Schematic representation shows the haptic functions.

References

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