Direct physical touch sensors based on liquid crystal-gated-organic field-effect transistors with a polymeric nanolayer

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Sensing of physical touches is no more strange actions because we do playing with smart phones every day. Most conventional touch systems are operated with capacitive and resistive actions of touch panels even though an in-cell touch technology has been recently developed and applied for smart phones. In this context, our group has invented new concept of touch sensor systems, which are based on organic field-effect transistors (OFETs) with an ultrasensitive sensing layer such as liquid crystals (LCs) and etc. The first generation of LC-integrated-OFET sensory devices was devised on the basis of LC-on-OFET device configuration, while the second generation was LC-gated-OFET architecture. Very recently, we have successfully demonstrated that the planar LC-g-OFET devices with a polymeric dipole layer (DCL) exhibited excellent transistor characteristics and could sense an ultralow level gas flow. In this presentation, we show the characteristics of planar DCL-LC-g-OFET sensory devices upon direct physical touches and demonstrate outstanding sensing stability even by human fingers.