

Piezo-modulated Ionic Tactile Memory Transistor for Neuromorphic Tactile Interface

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As the performance of electronic devices has noteworthy improved in recent years, the traditional device is pointed out limitation of energy consumptions and processing efficiencies. Neuromorphic technology, which mimics the mechanisms of the nervous system, such as spiking activity, is an attractive alternative to resolve these limitations. However, most traditional neuromorphic tactile applications consist of synaptic transistors that receive signals from tactile sensors. Herein, we describe a novel design of a monolithic tactile memory device based on a piezosensitive ion channel layer. The ion channel contains micro-particles that function as ion trap sites by pressure stimuli. Thus, the pressure changes can be detected in real-time while maintaining the memory effect due to the electrochemically doped multi-level channel conductance by ion concentration change. Consequently, we believe that novel design will provide new insight into developing Neuromorphic applications.