

Highly sensitive capacitive sensor based on ion gel thin electrodes for detecting static and dynamic pressure

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We report a new class of a simple and highly sensitive capacitive sensor, which is capable of detecting static and dynamic pressure changes. This capacitive sensor was realized by vertically sandwiching a sandpaper-molded conductive elastomeric layer between ion gel thin film electrodes. Our capacitive sensor can offer the outstanding sensor performance to detect directional movement of applied pressure distinguishably as well as vertical static pressure change without unit cell arrays of sensing elements. No similar approaches have been demonstrated so far for identifying such directional change of pressure on the sensor surface using the ion gel thin film. The proposed capacitive pressure sensor exhibited high pressure sensitivity, low minimum detection limit, fast response to pressure changes, high durability, and low operating voltage. Our approach for producing the highly sensitive capacitive pressure sensor is extremely simple without complicated procedures for patterning or printing complex array structures of sensing elements.