Flexible piezocapacitive pressure sensors fabricatedby all-solution-process for human-machine interfaces

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Recently, human-interactive sensors have received significant attention due to their significance in relation to various advanced applications such as electronic skin, electronic textile, flexible touch displays, and mobile healthcare aids [1-2]. For practical uses in these applications, high sensitivity of such sensors is essential to sense the applied low pressure, which surpasses the sensing capability of human skin. In general, advances in micro electro-mechanical systems (MEMS) have been demonstrated to realize highly sensitive pressure sensors [3-4]. However, the conventional MEMS based pressure sensors exhibit the critical limitation in large-are applications of electronic skin and touch displays. Furthermore, it is considerably difficult to realize flexible MEMS based sensors due to the serious deformation of the rigid materials. In this presentation, we will demonstrate flexible piezocapacitive pressure sensors fabricated by all-solution-process, which is capable of wide sensing range from low pressure (<1 kPa) to high pressure (>100 KPa) with high sensitivity. We will also discuss comprehensive sensing mechanism of the proposed piezocapacitive pressure sensors based on nano-porous structure using a dielectric elastomer. We believe that this work can provide new opportunities for innovative human-machine interfaces based on nano-porous structure.

References

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