

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Out-of-plane actuation for the PVCg actuator under electrical field of 1.0 Hz and 9.09 V/ μm .

File Name: Supplementary Movie 2

Description: Out-of-plane actuation for the CEC/PVCg actuator under electrical field of 1.0 Hz and 9.09 V/ μm .

File Name: Supplementary Movie 3

Description: Force output for the PVCg actuator, where a 100 g weight was lifted under electrical field of 1.0 Hz and 9.09 V/ μm .

File Name: Supplementary Movie 4

Description: Force output for the CEC/PVCg actuator, where a 300 g weight was lifted under electrical field of 1.0 Hz and 9.09 V/ μm .

File Name: Supplementary Movie 5

Description: The CEC/PVCg sensor was triggered by a linear reciprocating actuator, and the resultant sensing signal was collected by a single-chip microcomputer.

File Name: Supplementary Movie 6

Description: The CEC/PVCg sensor was used to monitor the human knee' motion, whose sensing signal was collected online in real-time by a single-chip microcomputer and a wireless transmission module.