

**Title:** Supplementary Movie 1.

**Description:** Insensitivity of the PWS films to strains, shown by no change in intensity of the LED.

**Title:** Supplementary Movie 2.

**Description:** In the repeated stretching and releasing cycles, the PWS electrode exhibits small resistance variation with strain.

**Title:** Supplementary Movie 3.

**Description:** An adhesive PWS film bearing a weight of 250 g attaches tightly onto the ITO.

**Title:** Supplementary Movie 4.

**Description:** An adhesive PWS blend film is peeled off from the skin.

**Title:** Supplementary Movie 5.

**Description:** After repeated stretching/releasing cycles, the PWS films still keep stable adhesion on the glass plate and skin.

**Title:** Supplementary Movie 6.

**Description:** The PWS films attach tightly on a wrist that bends and twists vigorously and continuously.

**Title:** Supplementary Movie 7.

**Description:** The PWS dry electrode used to record the EMG signals and control the opening and closing of the anthropomorphic robotic hand remotely.

**Title:** Supplementary Movie 8.

**Description:** ECG waveform of a patient with clinically diagnosed Atrial Fibrillation.

**Title:** Supplementary Movie 9.

**Description:** EMG signals obtained from the patient during the Elbow jerk response.