

Additional supporting information

1. Movie S1: Supplementary Movie 1:

Reversible deformation of cone-shaped actuator. POE-6 strip was cut into a circular shape and fixed at its center point, then stretched in six directions. After removing the external force, the sample was kept at 25 °C for 3 days to fix the orientation and the movie was recorded upon heating and cooling.

2. Movie S2: Supplementary Movie 2:

Multiple reversible deformation of POE-6 actuated by body temperature.

3. Movie S3: Supplementary Movie 3:

Self-rolling of POE-6 actuator on human opisthenar. The actuator was prepared as follows: POE-6 strip was programmed into aligned LCE using the method described in experimental section. Then the strip was cut into an isosceles triangle shape with approximately 20 mm in length and 1 mm in height. The air temperature is about 18°C.

4. Movie S4: Supplementary Movie 4:

Self-rolling of POE-L actuator on ice surface. The actuator was prepared as follows: POE-L strip (25mm (L) × 3 mm (W) × 0.6 mm (T)) was twisted and fixed with tapes and kept at 40 °C for 24 hours.