

Supporting Information for:

**Actuation mechanisms of a semicrystalline elastomer-based polymer
artificial muscle with high actuation strain**

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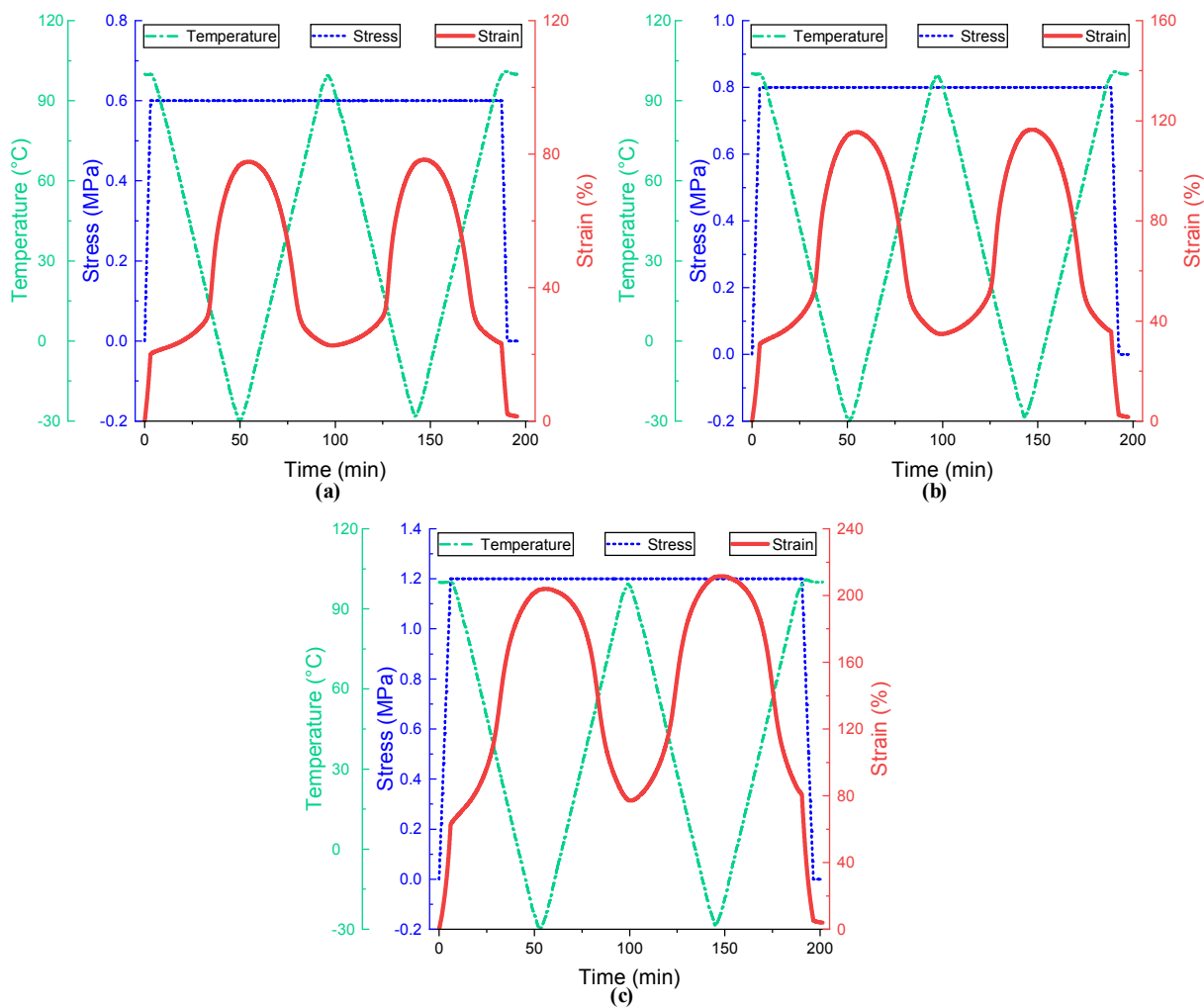


Figure S1. The temperature/stress/strain-time curves recorded in the DMA tests for studying the stress-dependent actuation behavior of the EPDM elastomer: (a) 0.6 MPa, (b) 0.8 MPa, and (c)

1.2 MPa (for the stress of 1.0 MPa, the curves are already displayed in Figure 1)

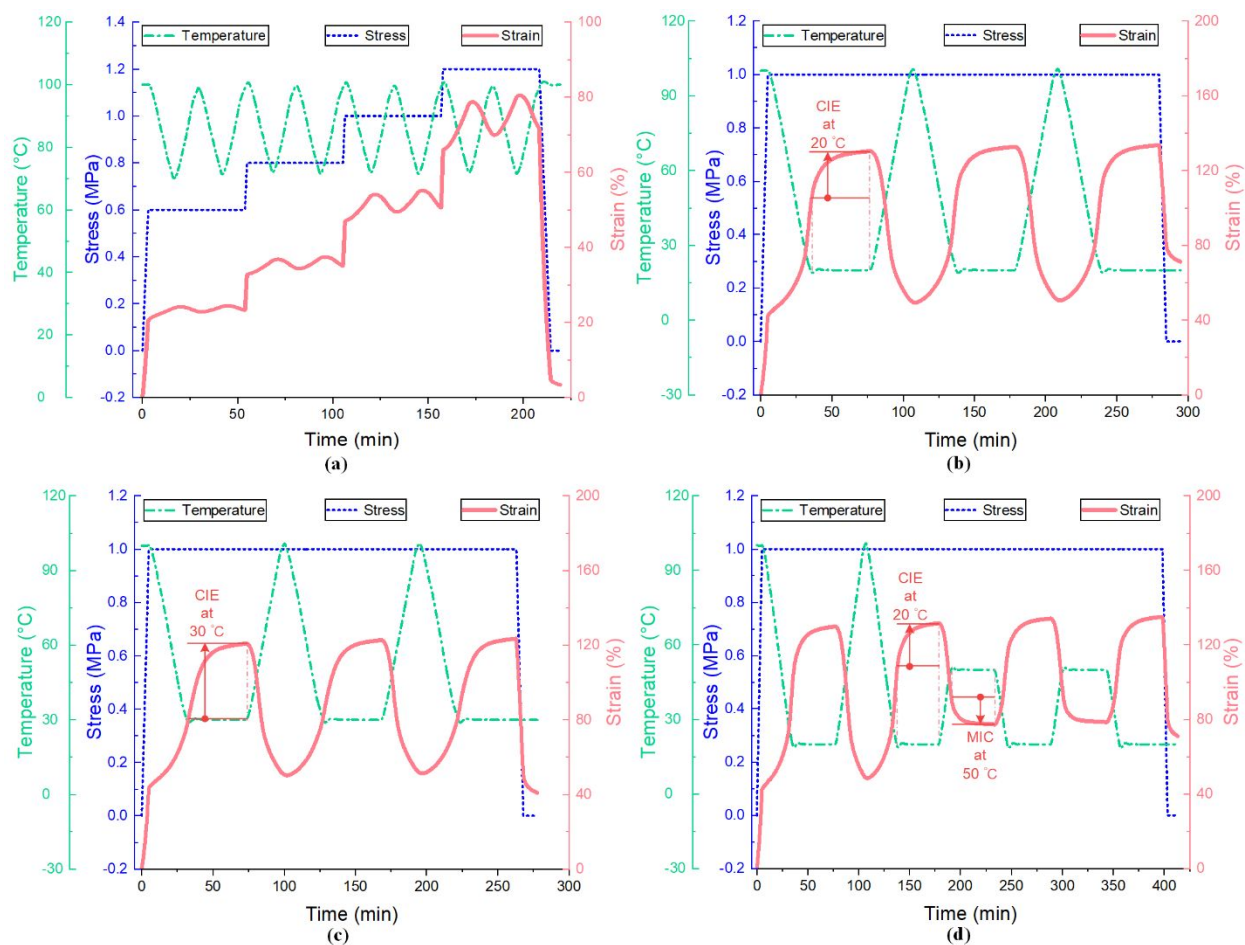


Figure S2. The temperature/stress/strain-time curves recorded in the DMA tests for directly demonstrating the eeTAM and cmtTAM (CIE and MIC) of the EPDM elastomer: (a) eeTAM above the melting temperature, (b) CIE at 20 °C, (c) CIE at 30 °C, and (d) CIE at 20 °C and MIC at 50 °C

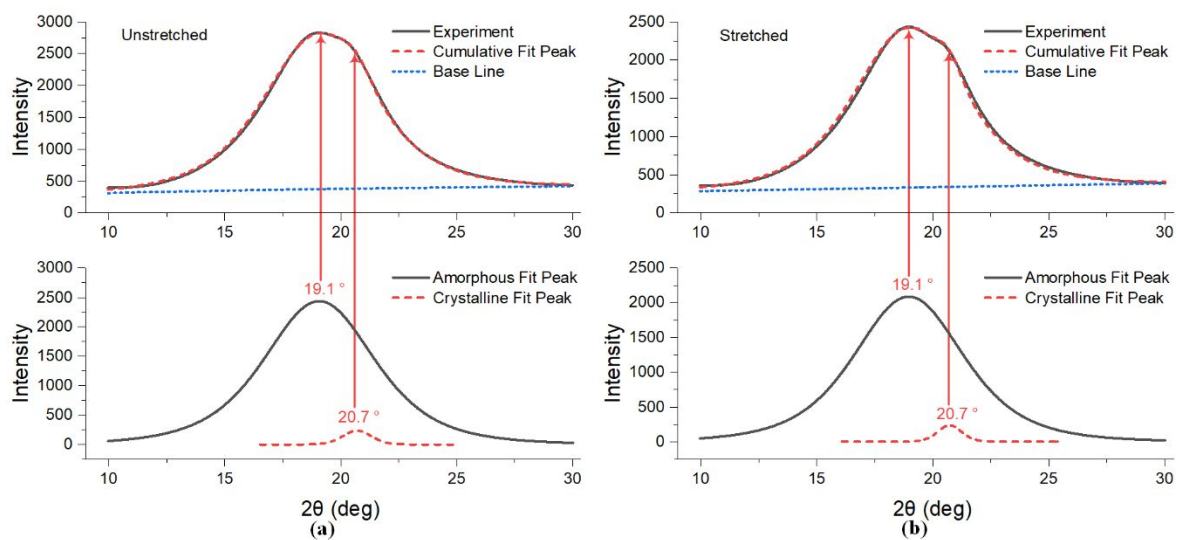


Figure S3. The fit peaks of the 2θ profiles for the two samples crystallized at 20 °C: (a) the unstretched sample, and (b) the stretched sample.

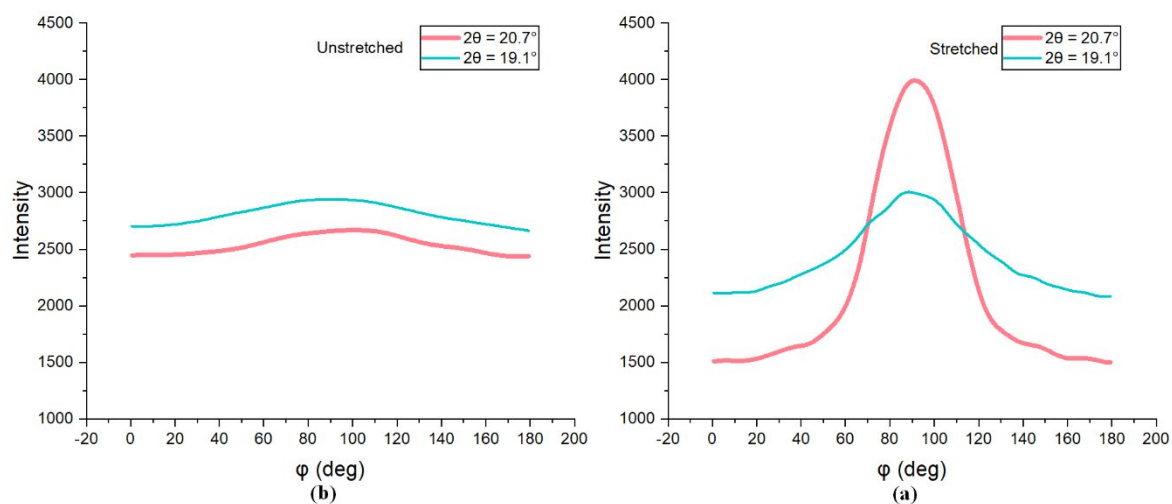


Figure S4. The azimuthal variation of the X-ray diffraction intensity near $2\theta = 20.7^\circ$ and 19.1° for the two samples crystallized at 20°C : (a) the unstretched sample, and (b) the stretched sample.

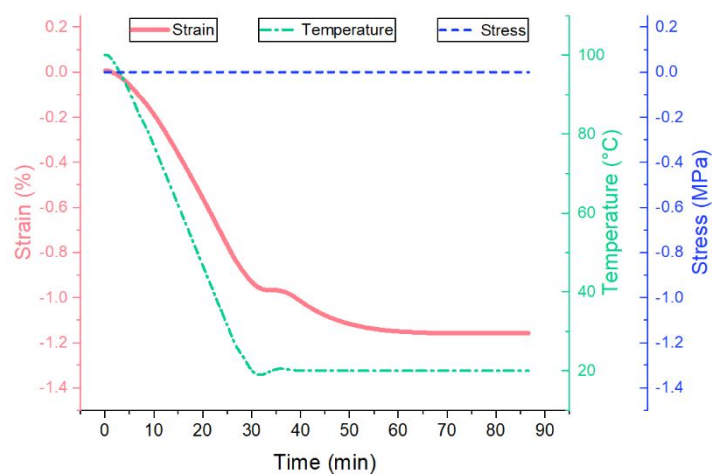


Figure S5. The strain/temperature/stress-time curves recorded in the crystallization test at 20°C under free state; the strain of the EPDM elastomer decreases as the temperature decreases from 100°C to 20°C and continues to decrease until the crystallization at 20°C is nearly finished, showing the elastomer only contracts in isotropic crystallization.