ELECTRONIC SUPPLEMENTARY INFORMATION (ESI)

# Reversible Wrinkles of Monolayer Graphene on a Polymer Substrate: Toward Stretchable and Flexible Electronics

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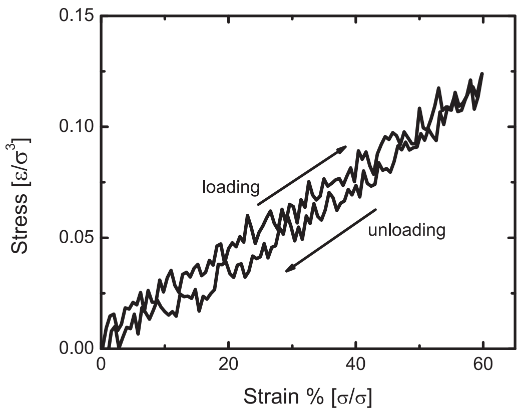


**Figure S1.** Stress-strain curve of the crosslinked polymer substrate under equal-biaxial tension. The strain rate is about $2 \times 10^{-5}\tau^{-1}$.

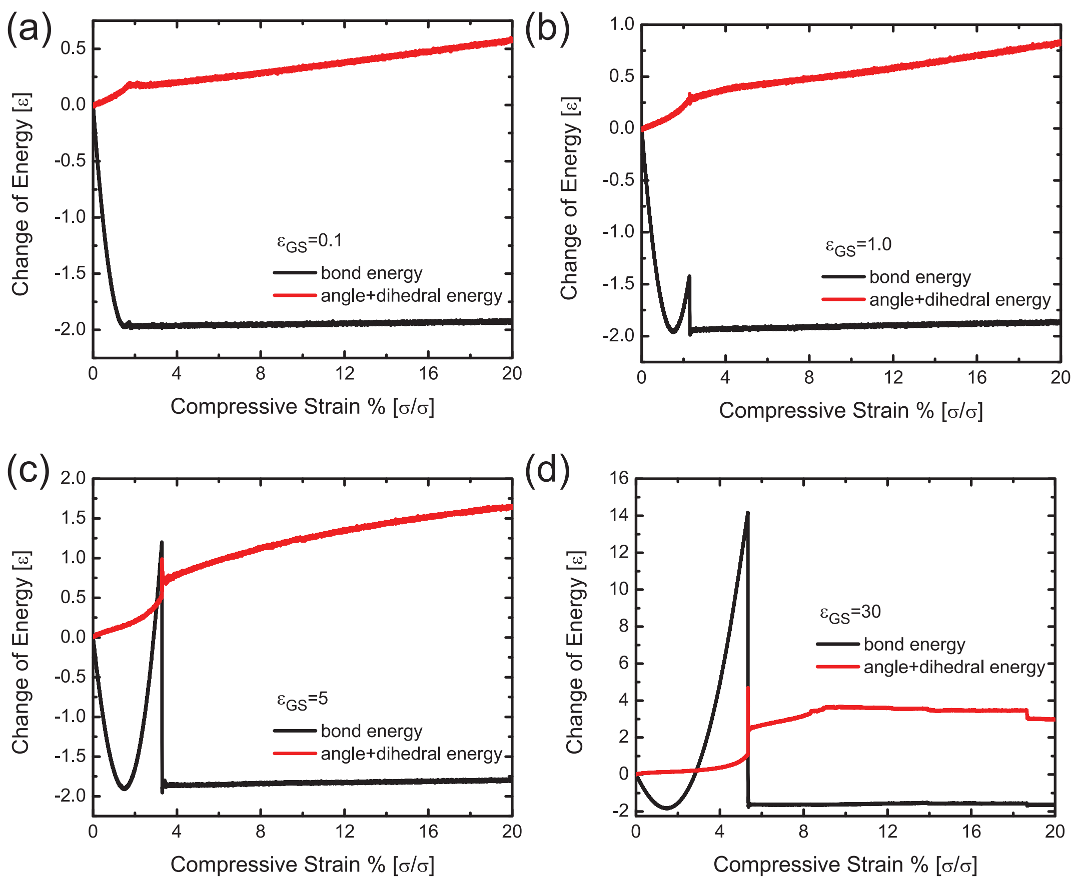


**Figure S2.** Energy change of monolayer graphene supported by a rigid substrate under equal-biaxial compression. The change of bond energy represents the in-plane stretching energy change. While the bending energy change is denoted by the change of angle and dihedral energies.

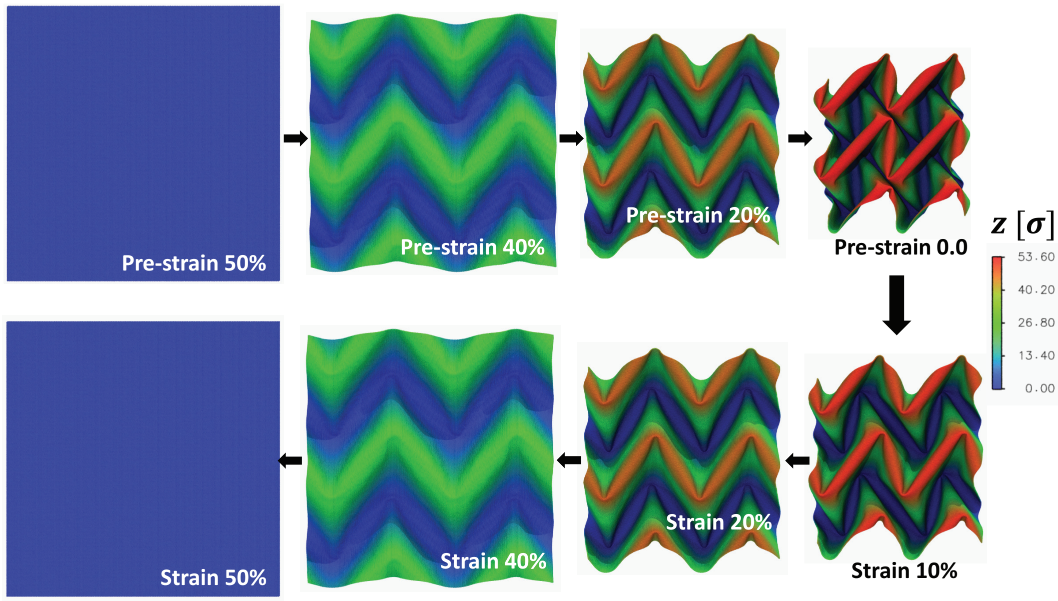


**Figure S3.** Snapshots of monolayer graphene supported by a pre-strained soft (polymer) substrate. The marked strain represents the strain level within polymer substrate. The coarse-grained carbon atoms are colored according to their out-of-plane ($z$ direction) displacement. Interaction between graphene and polymer substrate is determined by the pair parameter $\epsilon_{GS} = 1.0$.

**Video 1.mp4:** Monolayer graphene supported by a rigid (non-deformable) substrate under equal-biaxial compression. Interaction between graphene and rigid substrate is determined by the pair parameter $\epsilon_{wall} = 5.0$.

**Video 2.mp4:** Monolayer graphene supported by a soft (polymer) substrate under equal-biaxial compression. Interaction between graphene and polymer substrate is determined by the pair parameter $\epsilon_{GS} = 5.0$.

**Video 3.mp4:** Monolayer graphene supported by a pre-strained polymer substrate during relaxation of pre-strain within substrate. Interaction between graphene and polymer substrate is determined by the pair parameter $\epsilon_{GS} = 10$.

**Video 4.mp4:** Monolayer graphene supported by a pre-strained polymer substrate during equal-biaxial stretching of substrate. Interaction between graphene and polymer substrate is determined by the pair parameter $\epsilon_{GS} = 10$.