

Supporting Information for

Energy Renormalization for Temperature Transferable

Coarse-graining of Silicone Polymer

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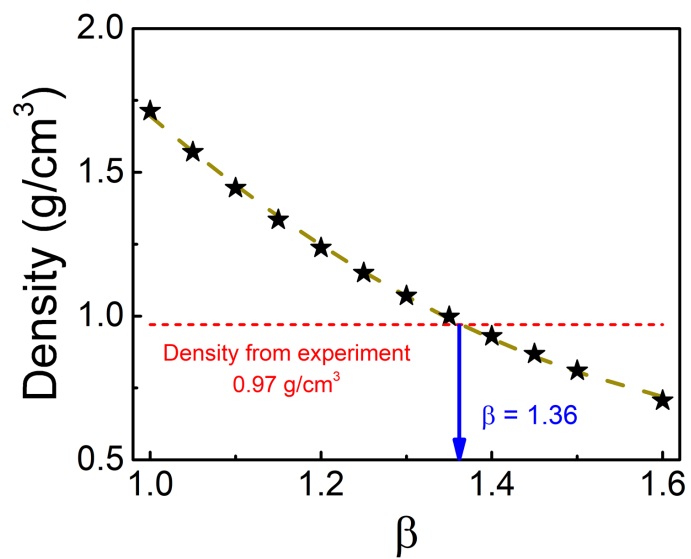


Figure S1. The density changes of PDMS CG model with varying β values at 300 K, with the experimental density of PDMS showing in red dashed horizontal line. To match the experimental density value, the β is determined as 1.36.

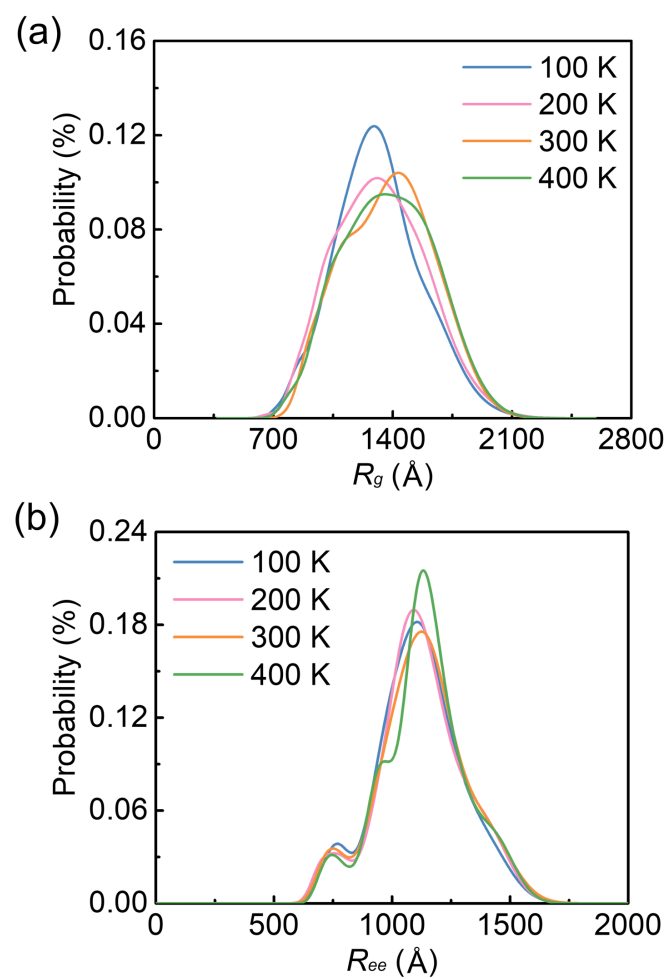


Fig. S2. Probability distribution of the conformational behaviors of the PDMS CG model at different temperature (a): R_g . (b) R_e .

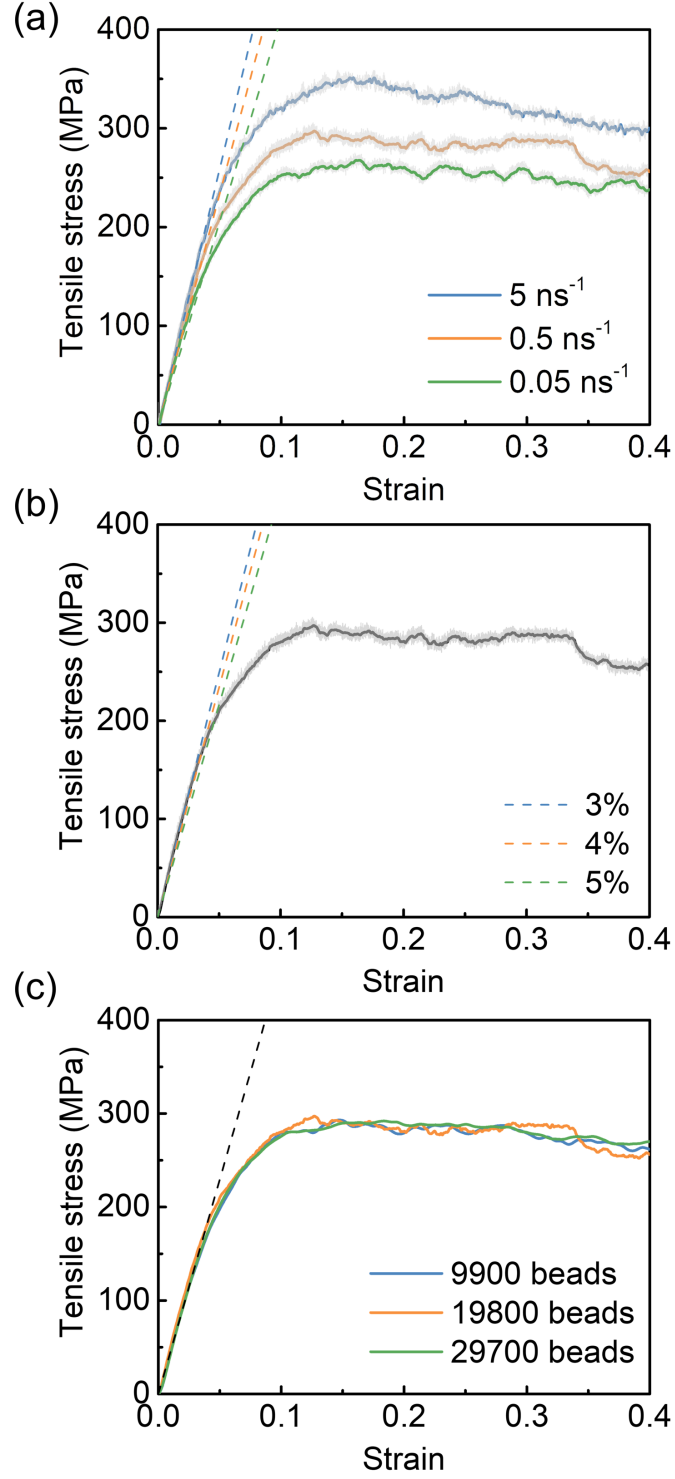


Fig. S3. Tensile stress-strain curves of the PDMS CG model at different strain rates, elastic strain ranges, and system sizes (a) strain rates of 5 ns⁻¹, 0.5 ns⁻¹, and 0.05 ns⁻¹; (b) elastic strain ranges of 3%, 4%, 5%; (c) system sizes of 9900 beads, 19800 beads, and 29700 beads.

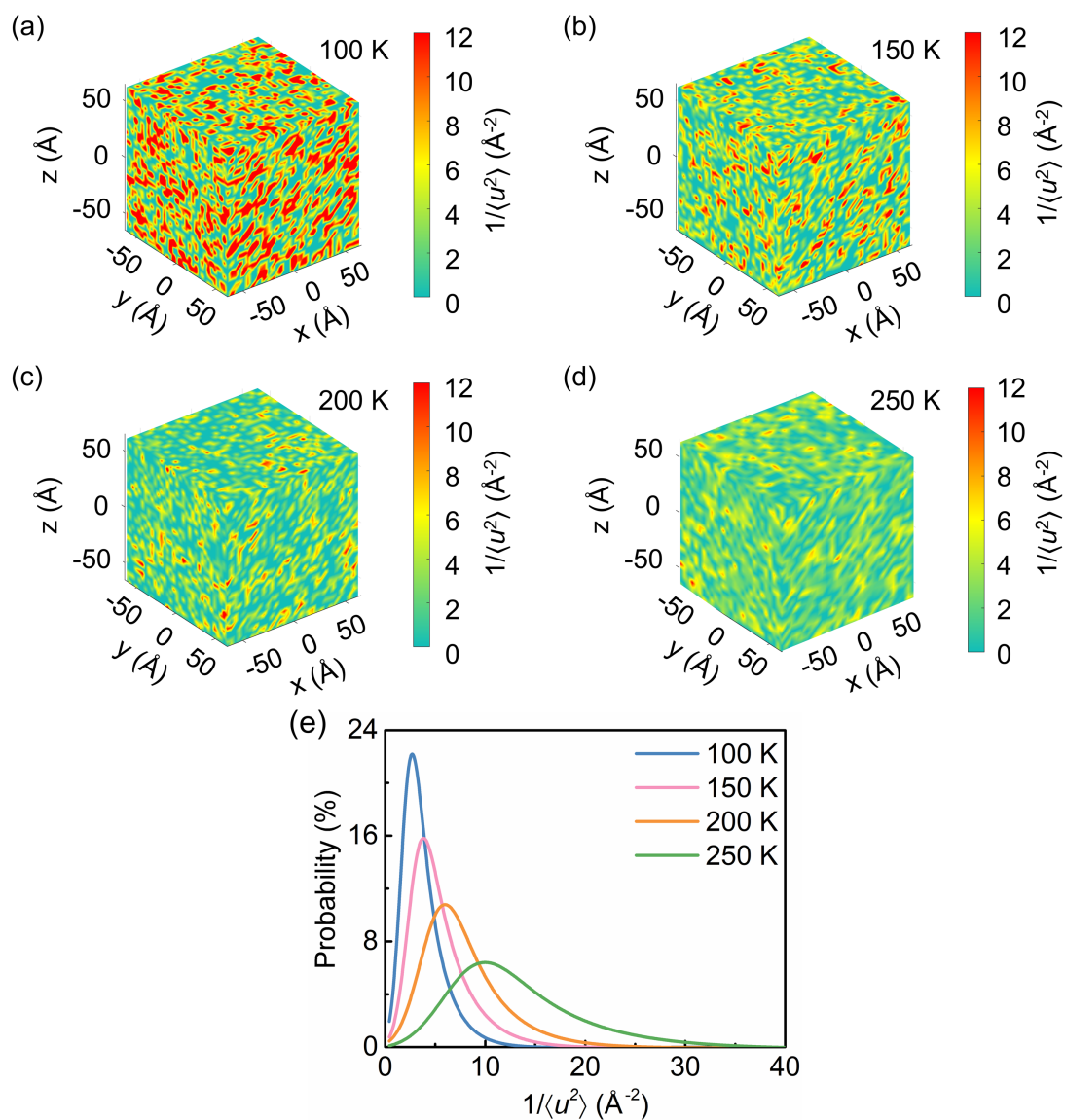


Fig. S4. (a ~ d) Representative color maps of $1/\langle u^2 \rangle$ for PDMS CG model at different temperatures. (a): 100 K; (b) 150 K; (c) 200 K; (d) 250 K; (e) Probability distributions of $1/\langle u^2 \rangle$ for the PDMS CG model at different temperatures.

Table S1. Young's modulus of AA and CG models from 100 K to 250 K.

Temperature (K)	$1/\langle u^2 \rangle$ (\AA^{-2})	E-AA model (GPa)	E-CG model (GPa)
100	9.3986	4.44	4.68
125	7.0656	4.11	4.24
150	5.7348	3.8	3.89
175	4.5092	3.53	3.58
200	3.5693	3.21	3.34
225	3.0146	2.88	3.03
250	2.3909	2.53	2.71