

Electronic Supplementary Material (ESI) for Nanoscale.

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## **Supplementary Information for**

### **Bio-Inspired Graphene-Derived Membranes with Strain-Controlled Interlayer Spacing**

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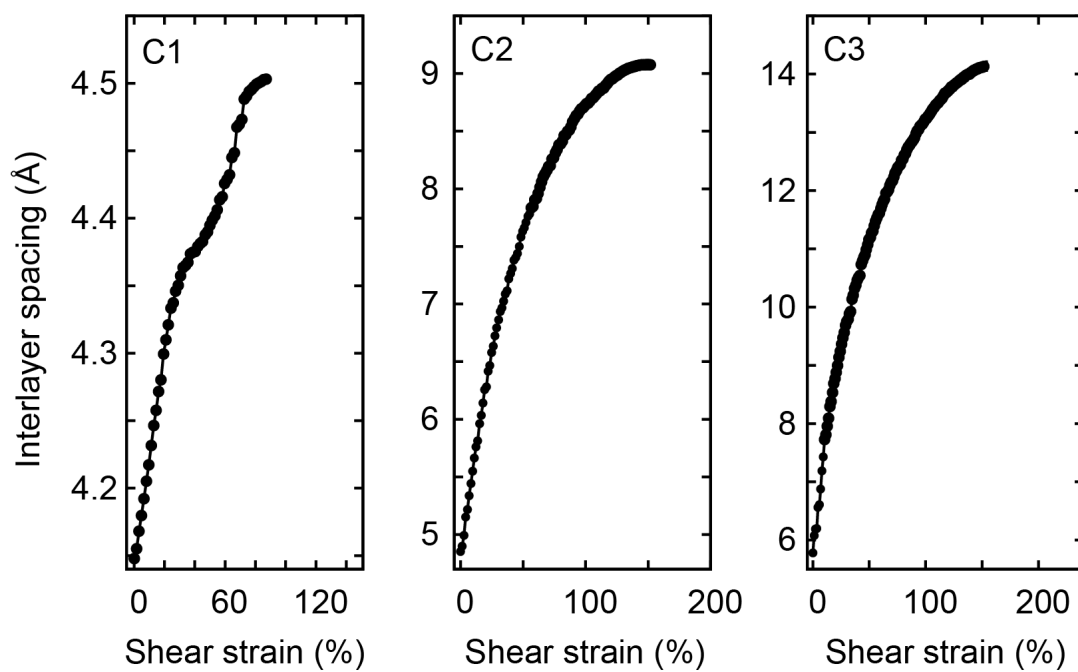
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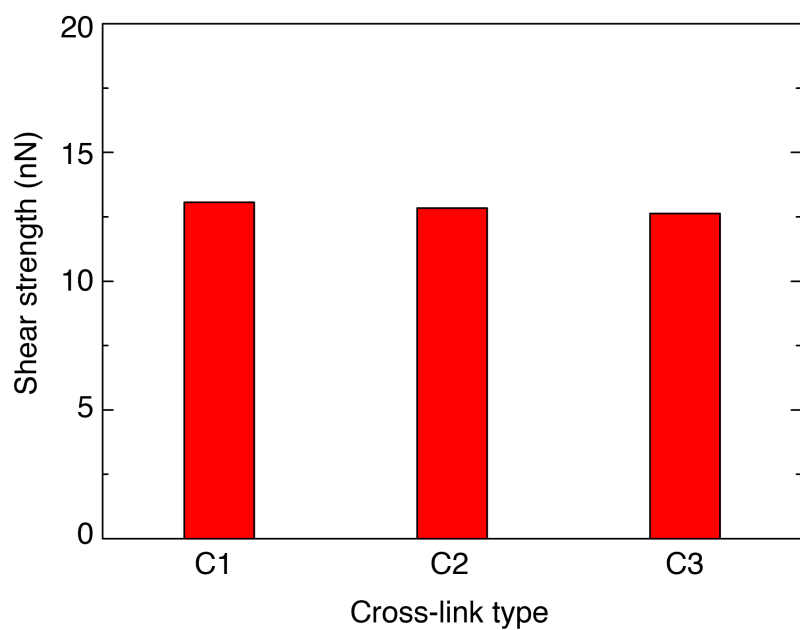
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The Supporting Materials contain

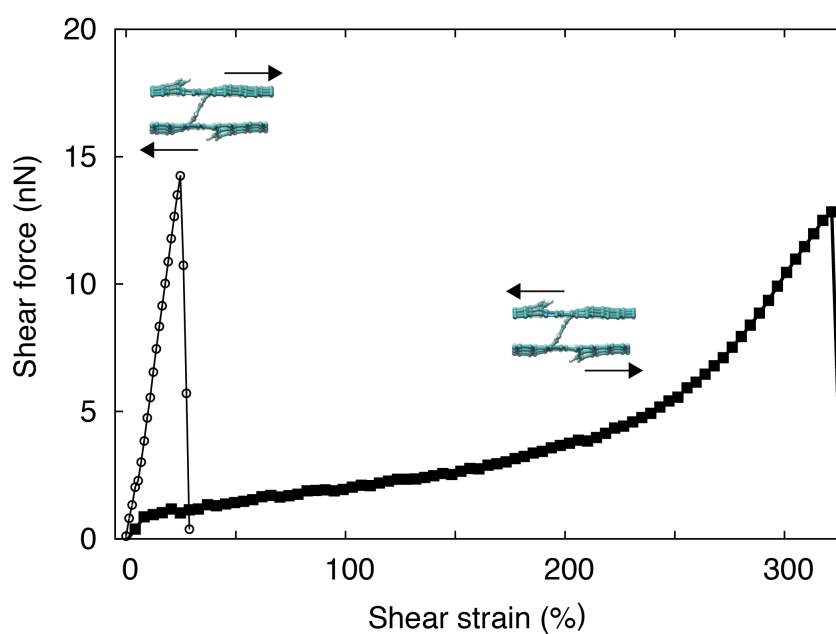
- Supplementary Figures S1-S4.



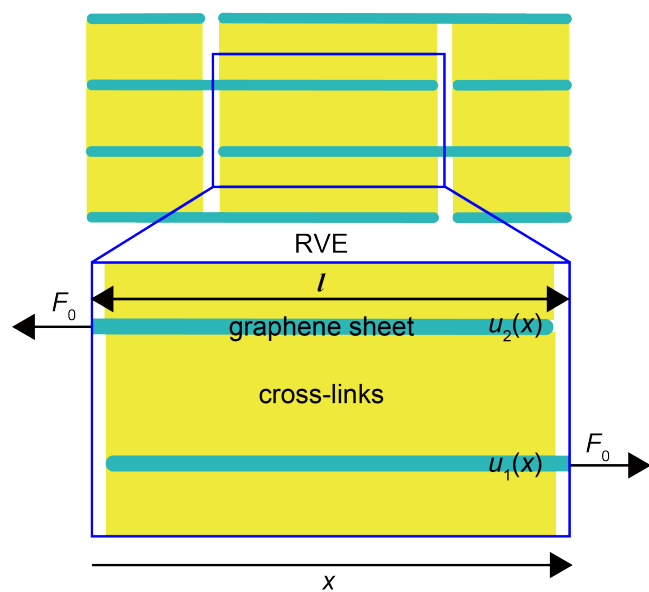
**Figure S1** The relation between interlayer spacing and shear strain calculated from DFT calculations, for supercells with three types of interlayer cross-links (C1, C2 and C3).



**Figure S2** The interfacial shear strength for graphene sheets cross-linked by C1, C2 and C3 structures, respectively.



**Figure S3** The shear force-strain relation calculated from DFT calculations for graphene sheets cross-linked by the C2 cross-links that rotate clockwise and anticlockwisely, respectively.



**Figure S4** A schematic illustration of the RVE used in the DTS model, where graphene sheets are crosslinked.