Supporting Information for

# Laser-Etched Stretchable Graphene-Polymer Composite Array for Sensitive Strain and Viscosity Sensors

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## Supplementary Figures

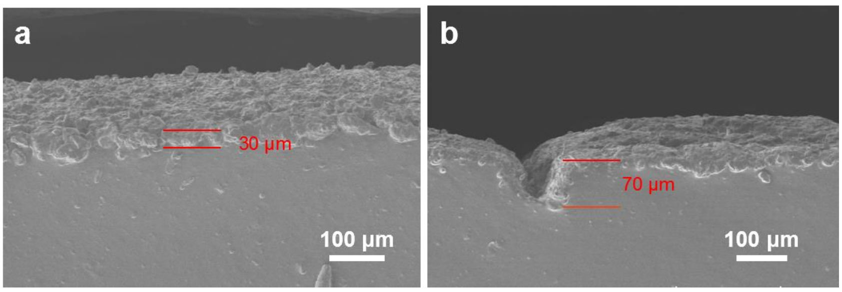


**Fig. S1 a** Cross-sectional SEM image of the of the Graphene/$SiO_2$/Ecoflex films. **b** Cross-sectional SEM image of the of the Graphene/$SiO_2$/Ecoflex films by laser erosion

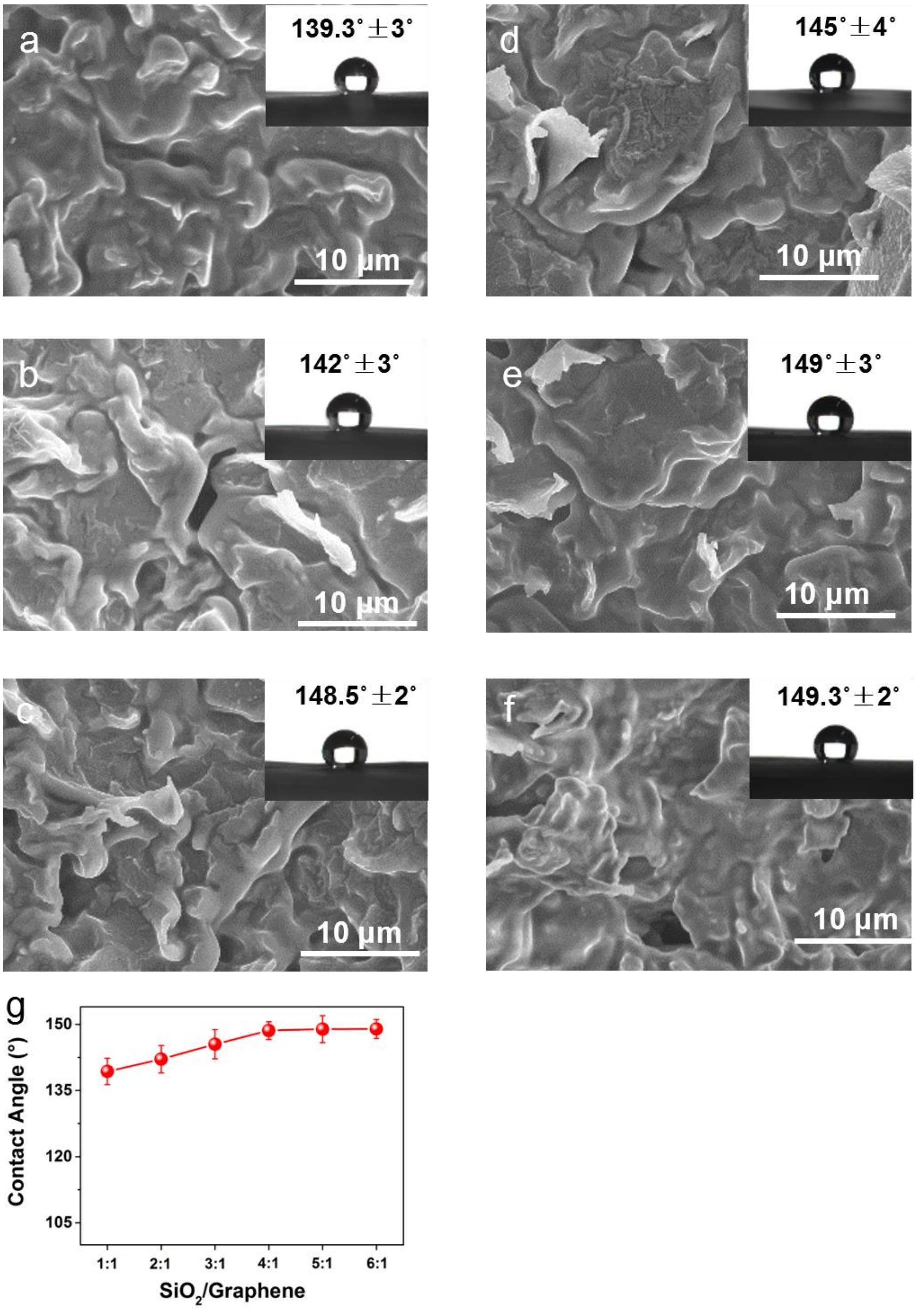


**Fig. S2 a-f** SEM images of Graphene/$SiO_2$/Ecoflex films with Graphene and $SiO_2$ at different rations by weight and the insets are their corresponding water contact angles. **g** Curve of water contact angle versus rations of Graphene and $SiO_2$ ($SiO_2$/Graphene=1:1~1:6)

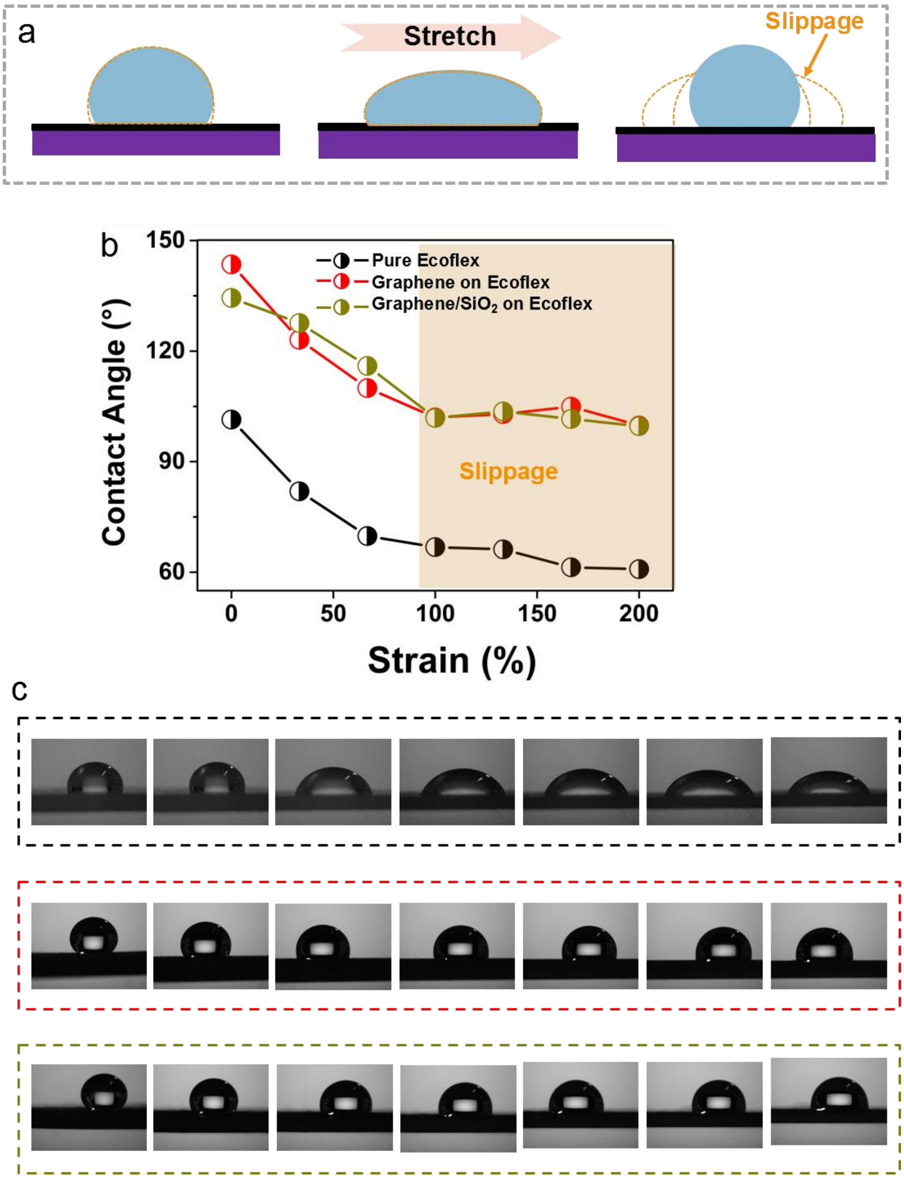


**Fig. S3 a** Schematic diagram of the film at different strains. **b** Curve of contact angle versus strain for Ecoflex film, $SiO_2$/Ecoflex and Graphene/ Ecoflex film. **c** Photographs of the stretched water drop for different composite films under the strain from 0% to 200%

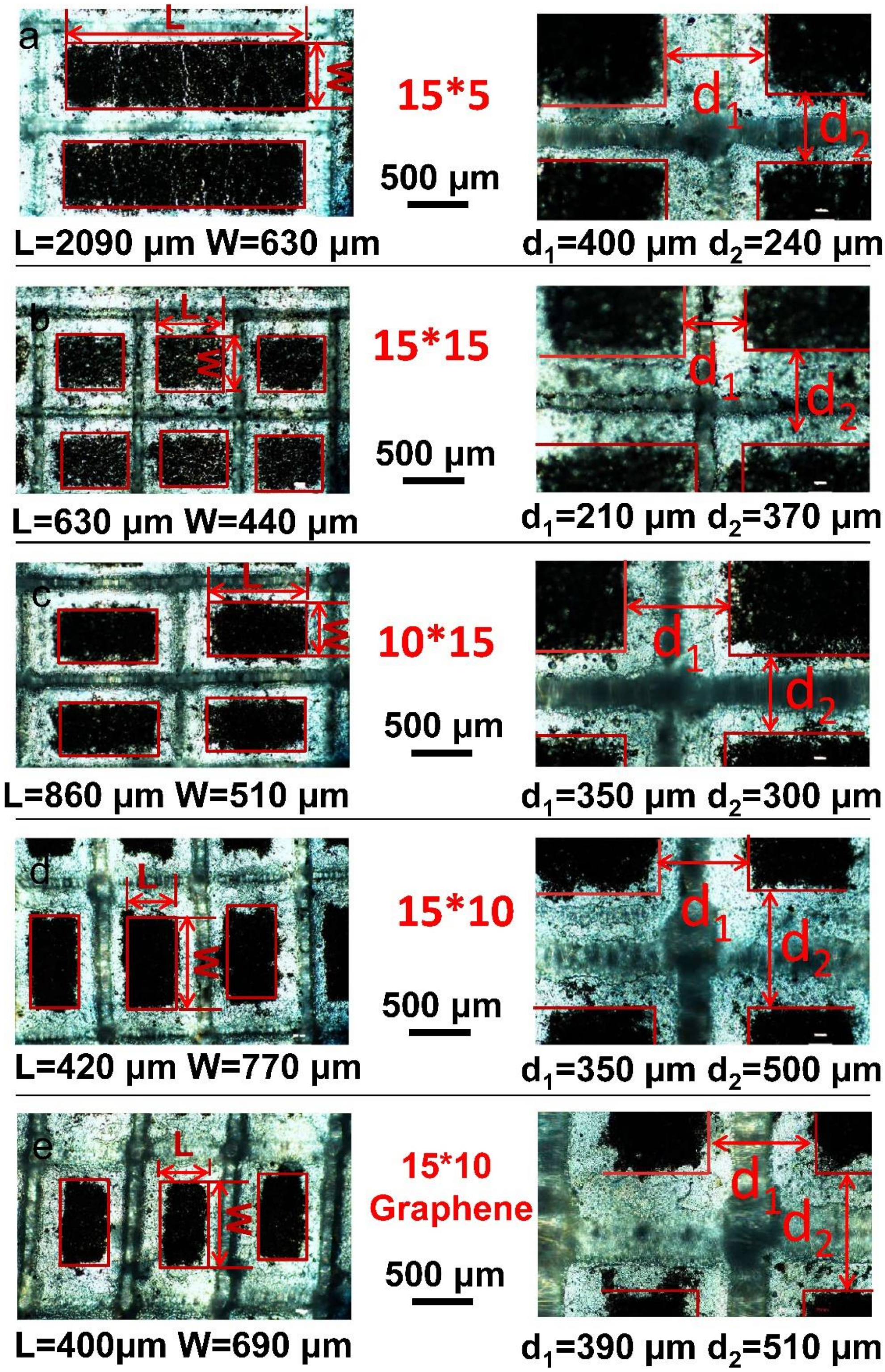


**Fig. S4 a-e** Optical photographs of Graphene/$SiO_2$/Ecoflex films with different arrays

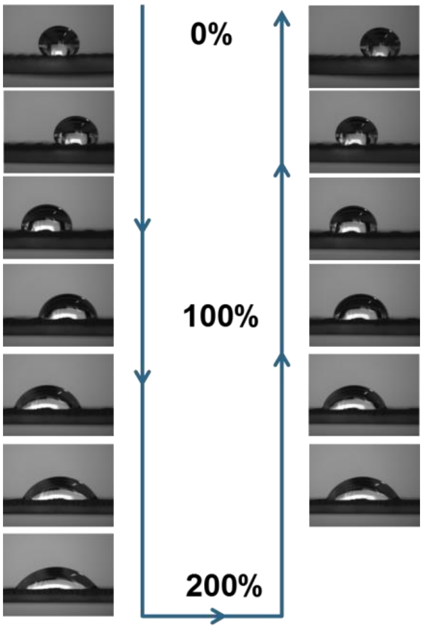


**Fig. S5** The change of the contact angle with respect to applied tensile strain

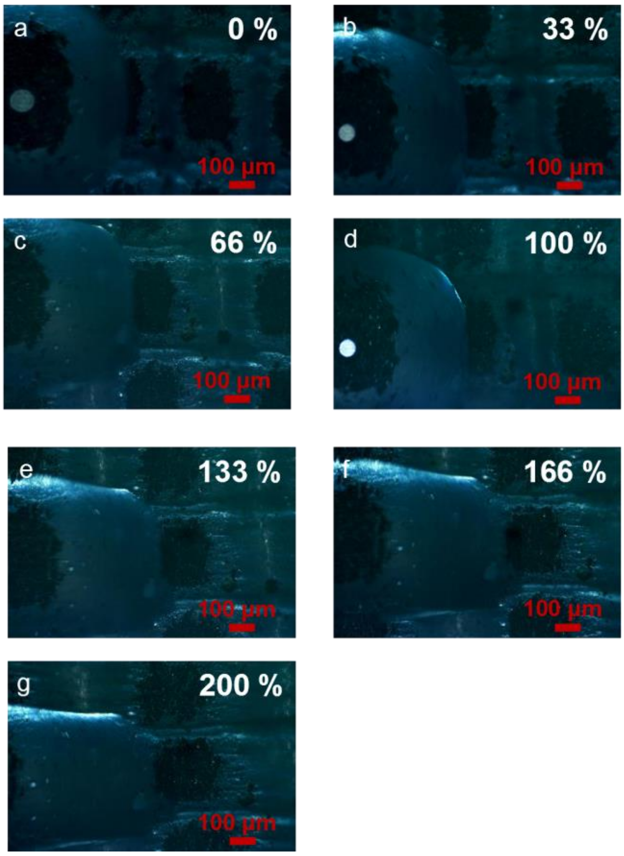


**Fig. S6** Change of the contact angle along with the film stretching. **a-g** Optical photographs of the stretched water drop at strains from 0% to 200%

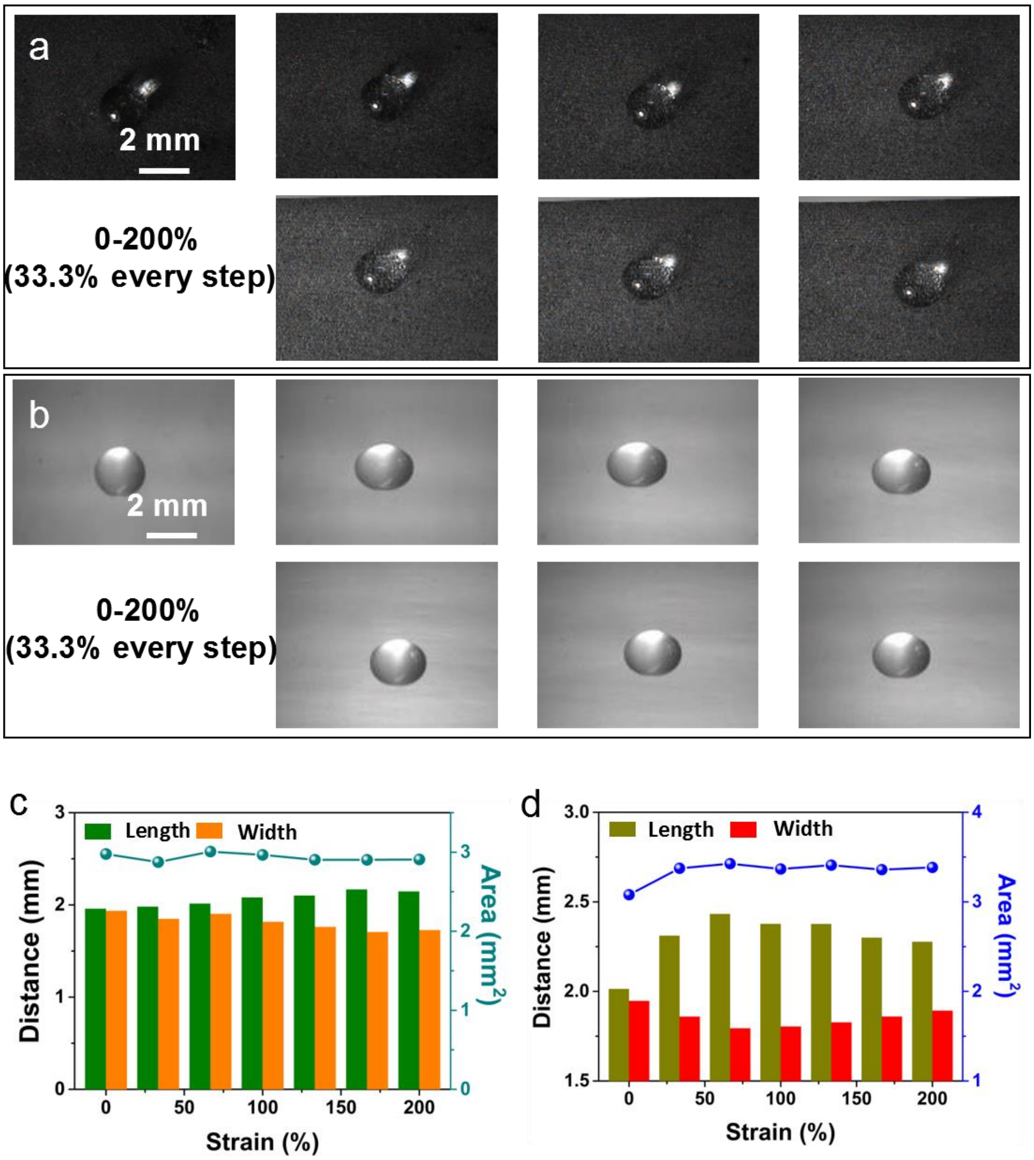


**Fig. S7** The change for the flat rubber film and graphene/$SiO_2$ composite film. **a** Photographs of Graphene/Ecoflex composite film under strains from 0%-200%. **b** Photographs of Ecoflex film under strains from 0%-200%. **c** Curve of area versus strain for Graphene/Ecoflex composite film. **d** Curve of area versus strain for film respectively.

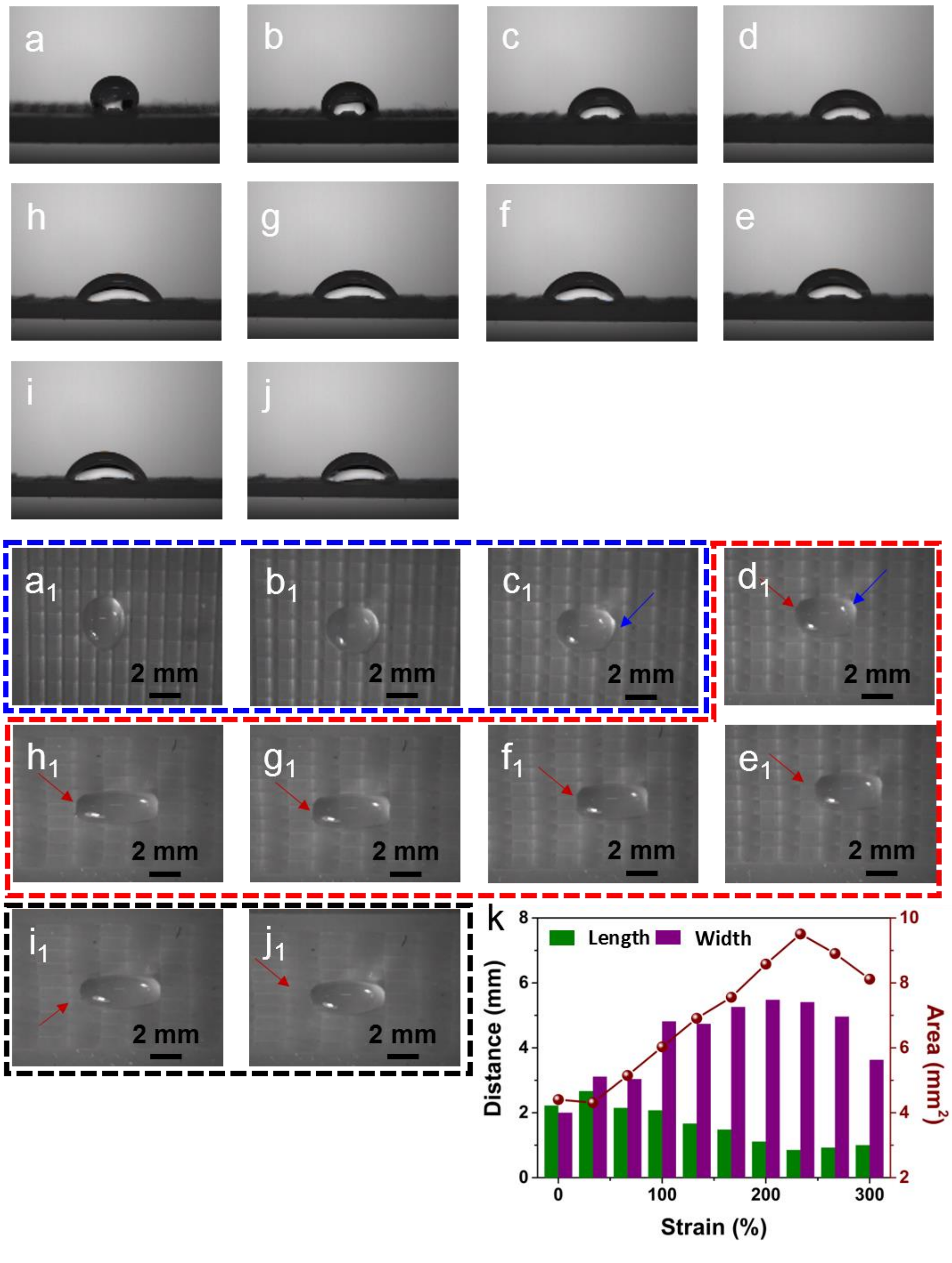


**Fig. S8 a** Photographs of Graphene/Ecoflex composite film under strains from 0%-200%. **b** Photographs of Ecoflex film under strains from 0%-200%. **a$_1$, b$_1$** Curve of area versus strain for Graphene/Ecoflex composite film and Ecoflex film

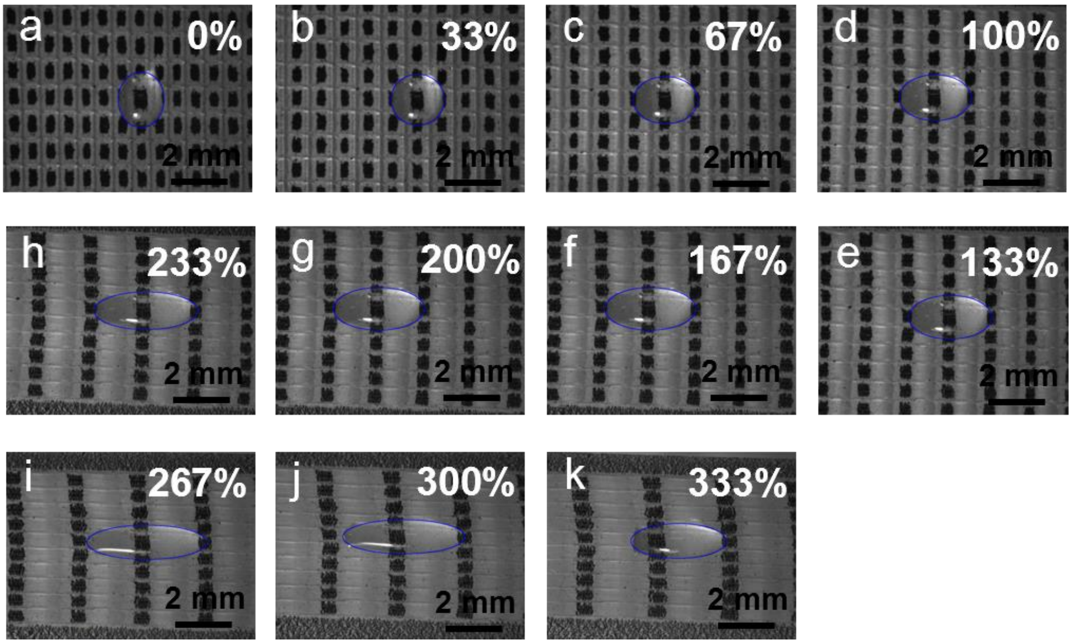


**Fig. S9 a-k** Photographs of the Graphene/$SiO_2$/Ecoflex composite film and drop shape under strains from 0%-333%

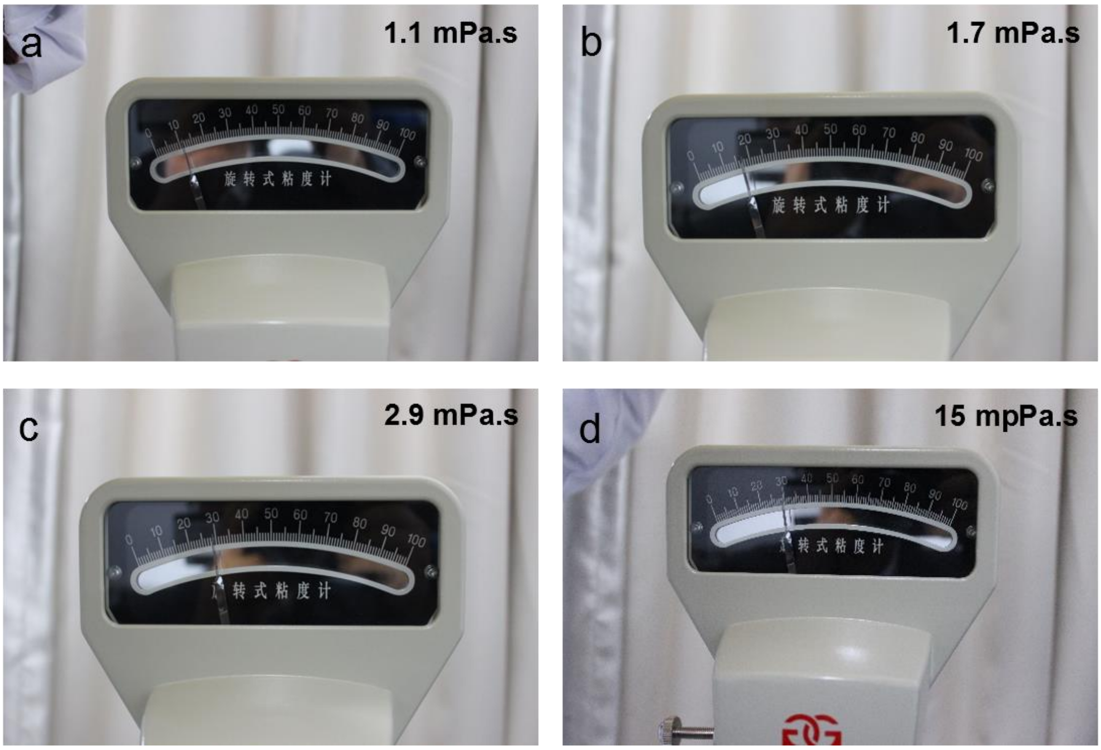


**Fig. S10 a-d** Photographs of viscosity values for water, blood, diluted blood and thickened blood respectively

## Supplementary Movies

**Moive-S1** Demonstration of the drop sliding on the pure rubber film

**Moive-S2** Demonstration of the drop with still sliding on the pure rubber film with arrays of individual patterns

**Moive-S3** Demonstration of the drop without sliding on the composite film with arrays of individual patterns

**Moive-S4** Demonstration of blood drops changing with stretching the film

**Moive-S5** Demonstration of contact angle of different drops with stretching the film