Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary Information for

Self-adapted and Tunable Graphene Strain Sensors for Detecting Both Gentle and Harsh Human Motions

Lu-Qi Tao[a], Dan-Yang Wang[a], He Tian[a,b], Zhen-Yi Ju[a], Ying Liu[a], Yu Pang[a], Yuan-Quan Chen[a], Yi Yang[*a] and Tian-Ling Ren[*a]

[a]Institute of Microelectronics and Tsinghua National Laboratory for Information Science and Technology (TNList), Tsinghua University, Beijing 100084, China

[b]Ming Hsieh Department of Electrical Engineering, University of Southern California, Los Angeles, CA 90089, USA;

*E-mail: yiyang@tsinghua.edu.cn; RenTL@tsinghua.edu.cn

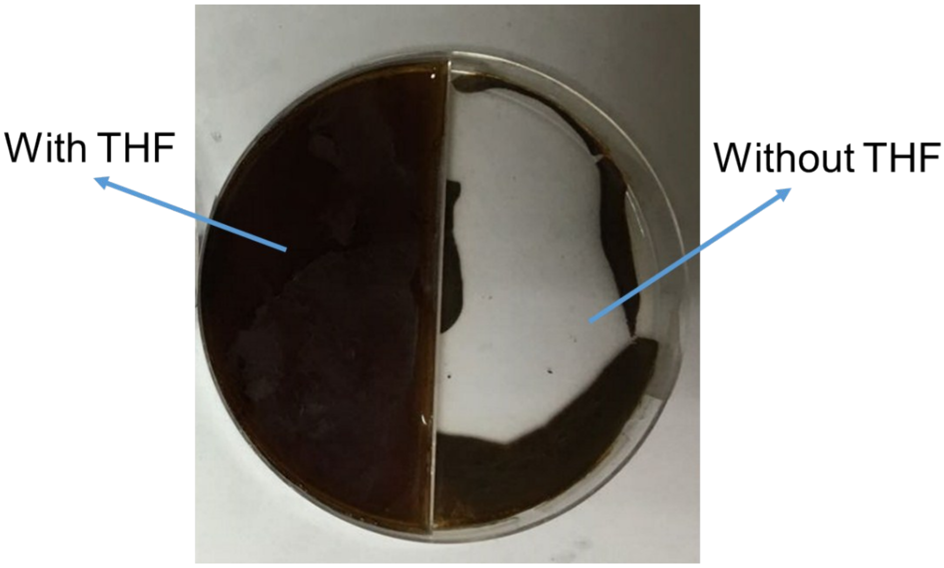

Fig. S1 The left is the uniform film with THF and the right one is the broken film without THF.

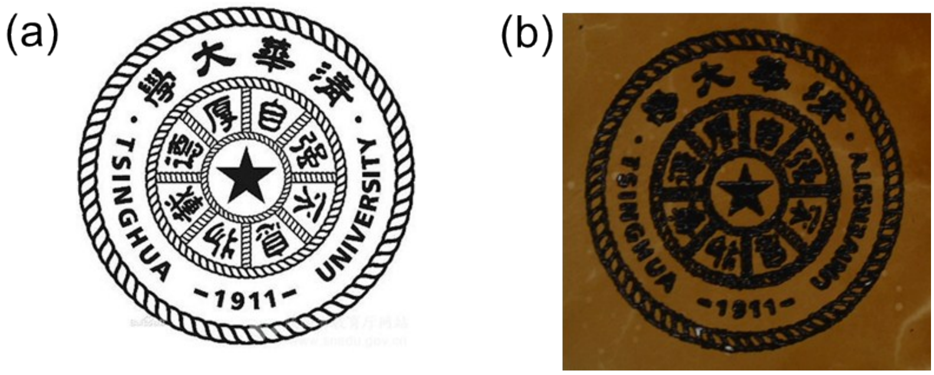

Fig. S2 Laser scribing technology can realize precise patterning. (a) A predesigned pattern, the logo of Tsinghua University. (b) the graphene generated at precise locations.

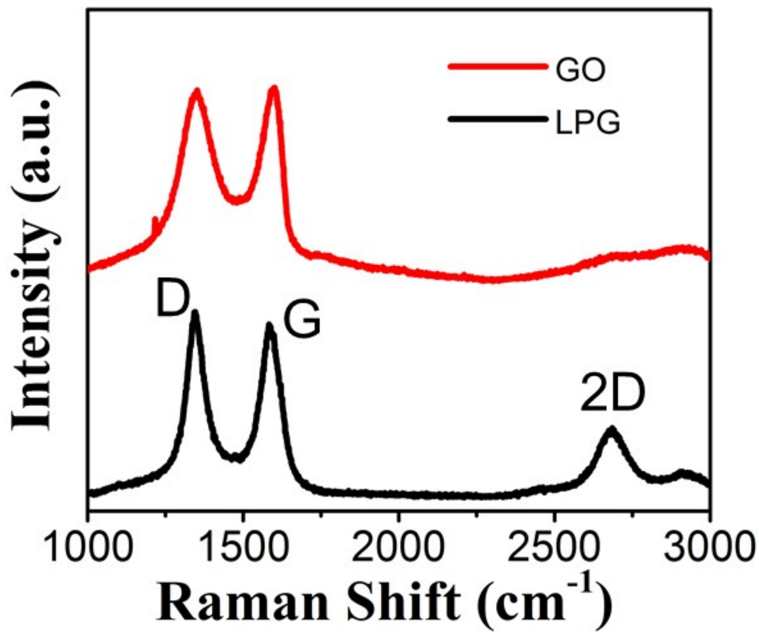

Fig.S3 The Raman spectrum of GO and LPG. The LPG showing obvious 2D peak compared with GO.

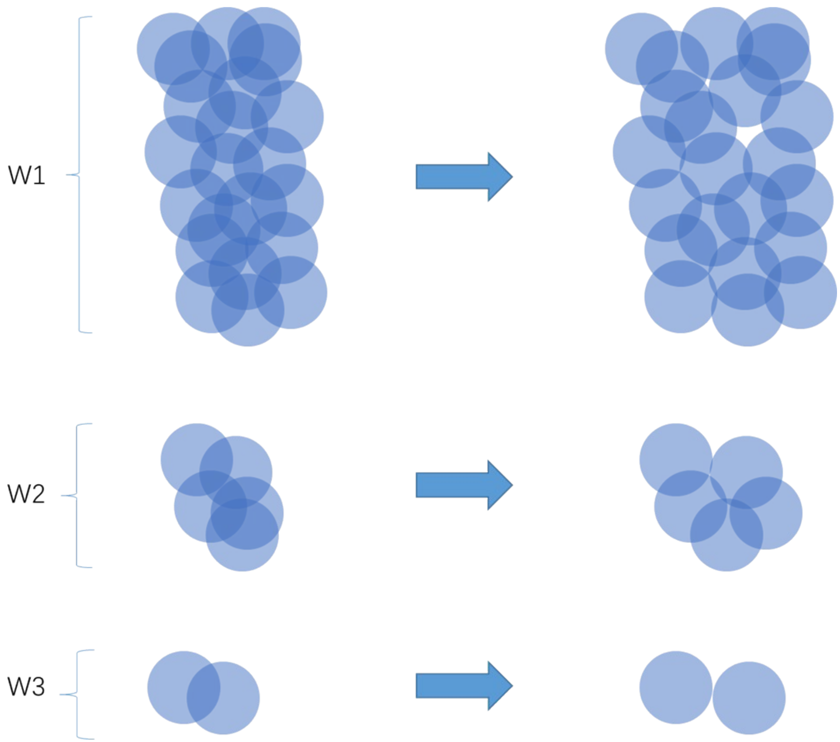

Fig.S4 The schematic illustration of the working principle. The no-mesh strain sensor contains a wide line (the width of the line is W1), while the high-mesh-density strain sensor contains a lot of thin lines (the width of the line is W3). It will be easier for a thin line to form open state. Therefore, the resistance of the high-mesh-density strain sensor will increase faster due to the formation of open line.

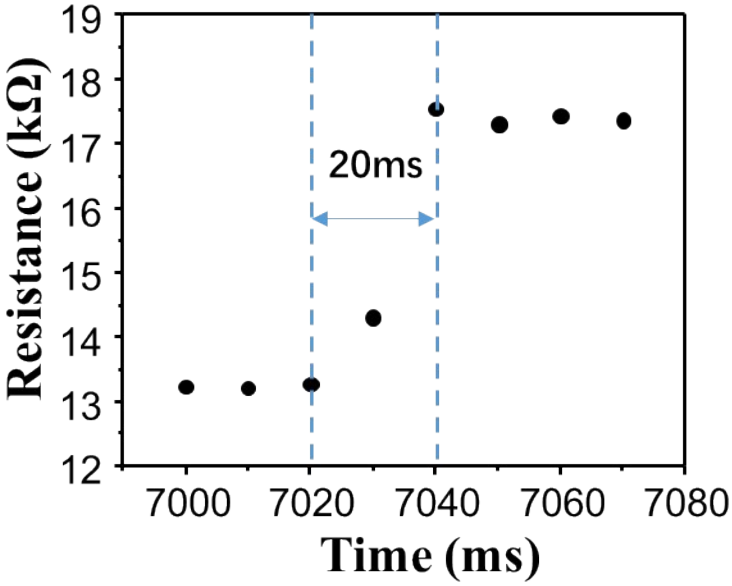

Fig. S5 The response speed of LPG strain sensor is less than 20 ms.

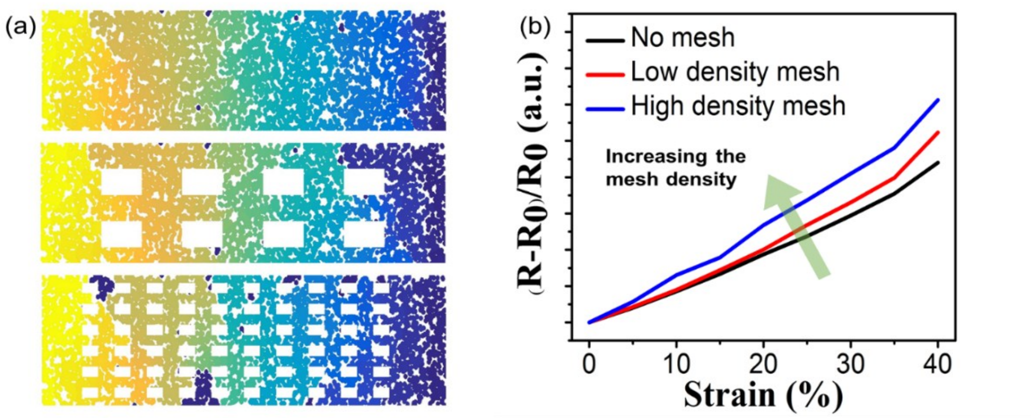

Fig.S6 Three models with different mesh densities were built to simulate the performance of the strain sensors. (a) The electric potential distribution in three models. (b) the simulation results of the strain sensors with different mesh densities.

Materials	**Strain Range**	**Gauge Factor**
Graphene microribbon[1]	10%	9.49
Graphene ripple[2]	30%	6.1
Graphene-Nanocellulose nanopaper[3]	100%	7.1
Graphene foam[4]	95%	2.3
Monolayer graphene[5]	4.5%	151
Pt Nanoparticles[6]	0.15%	75
Silver nanowires[7]	70%	116
Carbonized silk fabric[8]	500%	37.5
CNT-array double helices[9]	400%	12
Single-walled carbon nanotube[10]	280%	15
Nanographene by CVD[11]	1.6%	546
Pt-PDMS[12]	2%	2000
ZnO wire[13]	1.2%	1250
Laser patterned graphene flakes (no mesh)	**100%**	**268**
Laser patterned graphene flakes (high-density-mesh)	**35%**	**457**

Table 1. Performance comparison of graphene-based strain sensors

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