

Electronic Supplementary Materials

For <https://doi.org/10.1631/jzus.A2600182>

High-sensitivity and robust laser-induced graphene sensing arrays for spatiotemporal pulse mapping

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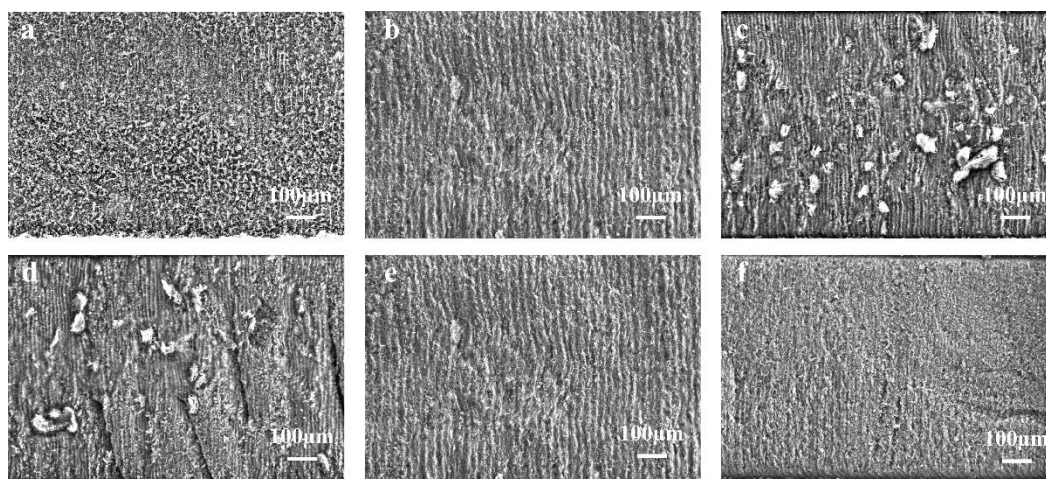


Fig. S1 SEM images showing LIG fabricated at laser powers of (a) 2.7 W, (b) 3 W and (c) 3.3 W, respectively. SEM images showing LIG fabricated at scanning speeds of (d) 90 mm s⁻¹, (e) 100 mm s⁻¹ and (f) 110 mm s⁻¹, respectively.

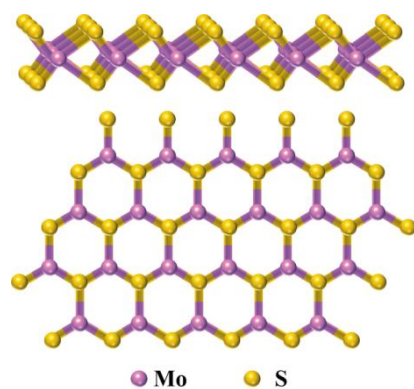


Fig. S2 The chemical structure of double-layer MoS₂.

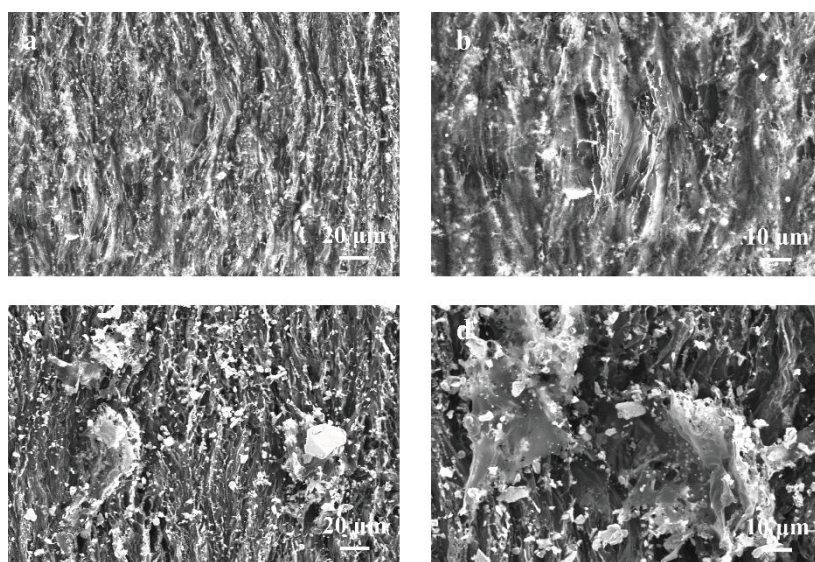


Fig. S3 SEM image of MoS₂-decorated porous graphene. SEM images of LIG before MoS₂ modification at scale bars of (a) 20 μm and (b) 10 μm. SEM images of LIG after MoS₂ modification at magnifications of (c) 20 μm and (d) 10 μm.

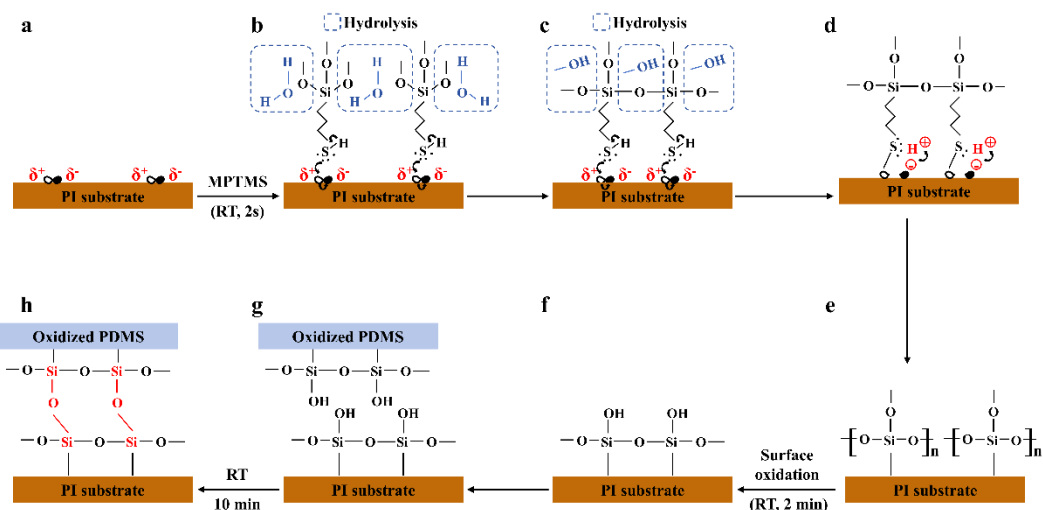


Fig. S4 Schematic of chemical bonding.

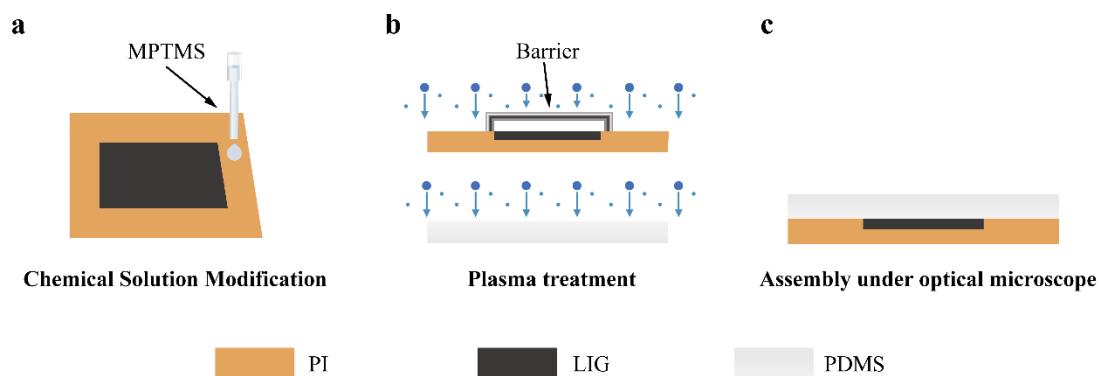


Fig. S5 The specific process of chemical bonding packaging.

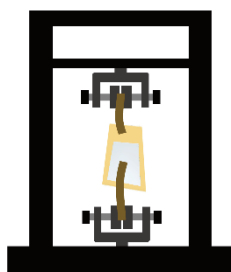


Fig. S6 Schematic of shear force testing for bonding strength.

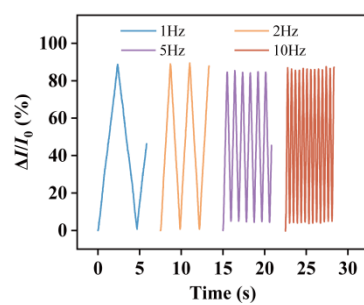


Fig. S7 Dynamic response of the sensor at different frequencies.

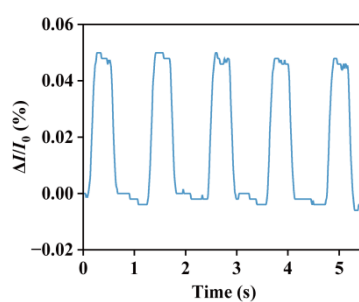


Fig. S8 Response of the pressure sensor at a micro-pressure of 0.005 N.

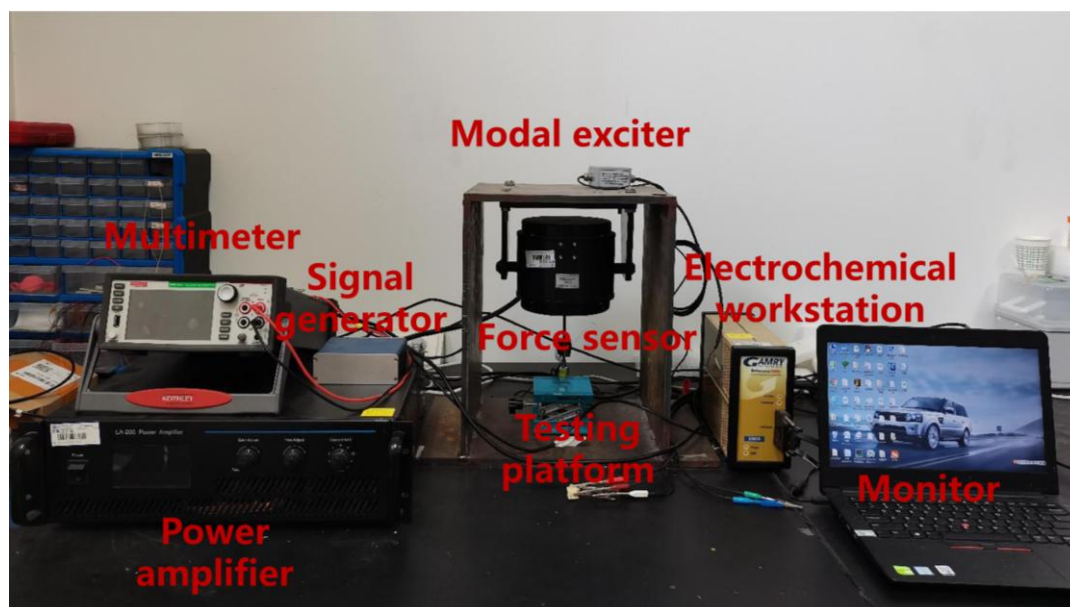


Fig. S9 Schematic diagram of the LIG pulse sensor testing system.

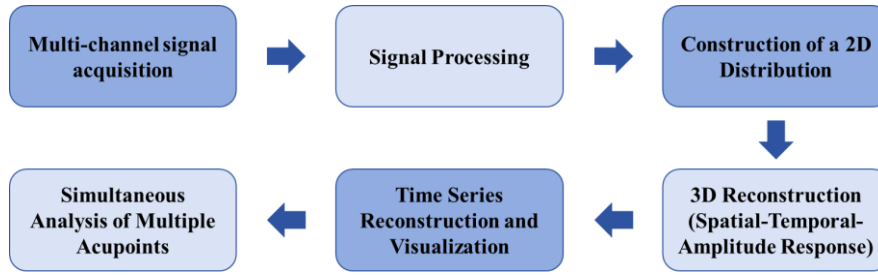


Fig. S10 Workflow for data processing and reconstruction of 3D pulse sensors.

Table S1 Machining Process Parameters

Sample	Maximum machining depth (nm)	Minimum Machining Depth (nm)	Average Machining Depth (nm)	Average Machining Error
S ₁	50.1	47.8	48.95	2.1%
S ₂	51.3	48.5	49.90	0.2%
S ₃	52.2	49.6	50.90	1.8%
S ₄	51.1	48.1	49.60	0.8%
S ₅	51.6	49.1	50.35	0.7%
Average	51.26	48.62	49.94	1.12%

Table S2 Comparison about performances of LIG pressure sensor between this work and other relevant literatures

References	Sensitivity/kPa ⁻¹	Pressure Range/kPa	Stability/cycle	Consistency/%	Response and Recovery Time/ms	Limit of Detection/Pa
R1	1.23×10^{-3}	100	15000	--	--	10
R2	1.34×10^{-3}	20	15000	--	44/45	--
R3	1.80/0.8	100/300	1000	--	30/120	--
R4	3.64/1.20/0.03	20/40/150	1000	--	50/70	--
R5	2.41/0.32/0.11/0.09	200/500/1000/3000	2000	--	2/2	1.2
R6	1.2	6	650	--	86/101	--
R7	0.243/0.018/0.003	200/1000/1600	500	--	42/43	6
This work	2.205/0.426	15/180	10000	6.61%	23/30	35

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