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Supplementary information

Temperature Self-Compensation Thin Film Strain Gauges Based on nano-SiO_2/AgNPs Composite

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Table S1 Performance comparison of the sensor with near-zero-TCR strain sensors prepared by functional ink reported in the literature.

Sensor Materials	Substrate	Process	Curing temperature of sensor materials (°C)	Maximum detectable strain (micro-strain is underline)	GF	TCR (ppm /°C)	Ref
Silver/carbon	PET	screen-printed	130	<u>0.08%</u>	7.7	Unclear	1
SWCNT/graphite	PET	spray coating	90	<u>0.16%</u>	5.0	Unclear	2
GNPs/Polysilazane	Al_2O_3	Direct ink writing	500	<u>0.04%</u>	19.1	-3.7	3
AgNWs/graphene	PDMS	Drop coating	90	40%	80	160	4
AgNPs/CNT	Silicone	Drop coating	60	100%	38.2	-11.6	5
MWCNT/graphene	Polyimide	Drop coating	Room temperature	Unclear	16.2	Unclear	6
graphene/CNT/silicone	-	Direct ink writing	Room temperature	100%	10.7	114	7
P3HT/BCF/AgNPs	Polyimide	Spin coating	80	6.1%	64	1100	8
PEDOT:PSS/DMSO	PET	Spin coating	120	2%	1.9	93	9
AgNPs	PET	Spin coating	Unclear	1%	51	19	10
Nano-SiO_2/AgNPs	**Alloy steel**	**Direct ink writing**	**150**	**<u>0.2%</u>**	**16.4**	**30**	**This work**

PET: polyethylene terephthalate, SWCNT: single-wall carbon nanotube, GNPs: graphite nanoplatelets, AgNWs: silver nanowires, PDMS: polydimethylsiloxane, AgNPs: silver nanoparticles, CNT: carbon nanotubes, MWCNT: multi-walled carbon nanotubes, P3HT: poly(3-hexylthiophene-2,5-diyl), BCF: tris(pentafluorophenyl)borane, PEDOT: poly(3,4-ethylenedioxythiophene), PSS: poly(styrenesulfonate), DMSO: dimethyl sulfoxide

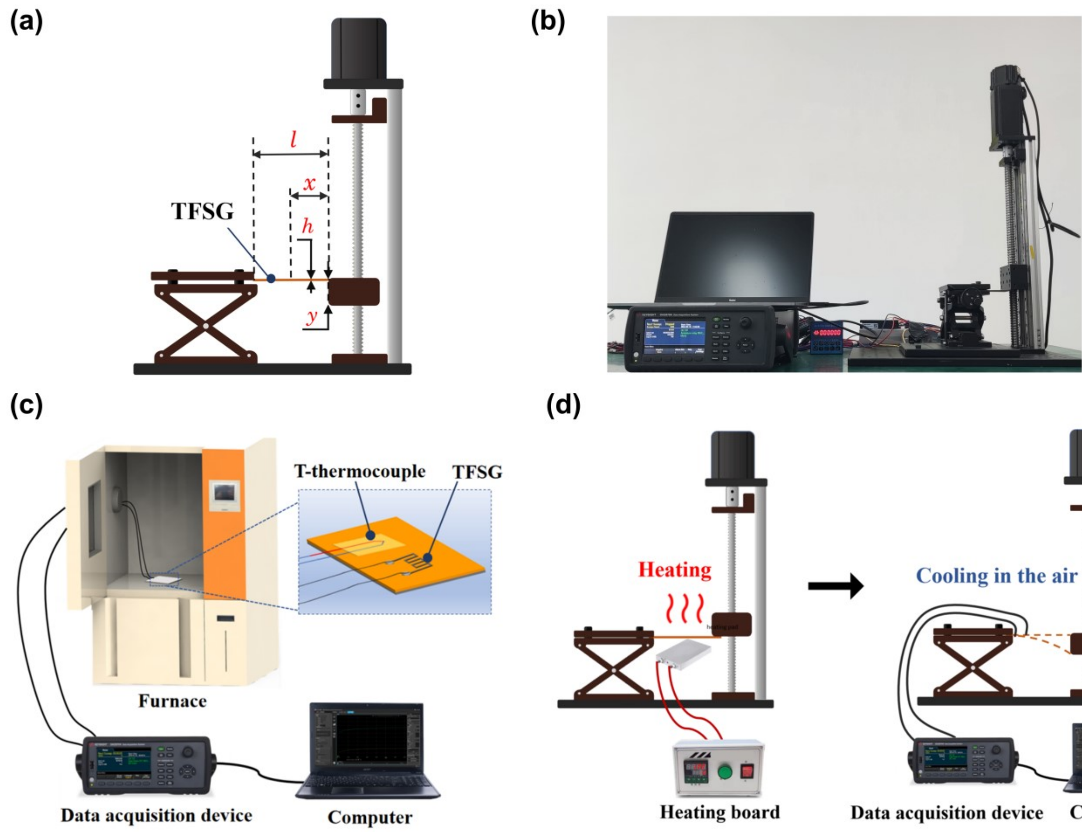

Fig. S1. (a) Experiment setup for strain response detection. (b) Platform for strain testing and acquisition. (c) Experiment setup for temperature-resistance detection. (d) Experiment setup for dynamic response detection under variable temperature environments.

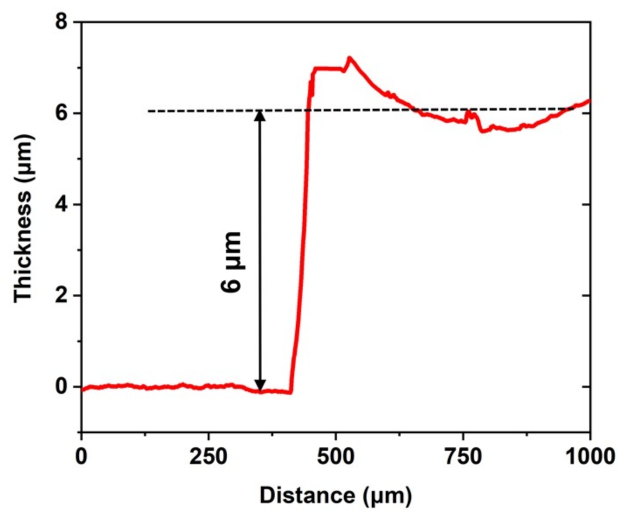

Fig. S2. The thickness of PI insulation film is close to 6 μm.

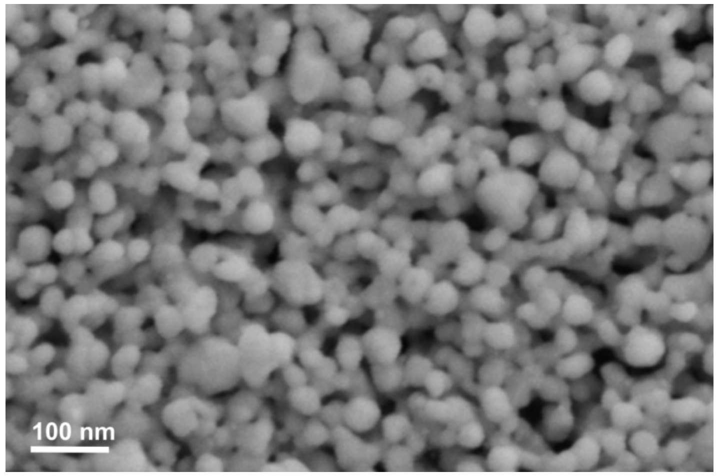

Fig. S3. SEM image of AgNPs thin films.

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