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Supplementary Information

Highly Stable Kirigami-Structured Stretchable Strain Sensors for Perdurable Wearable Electronics

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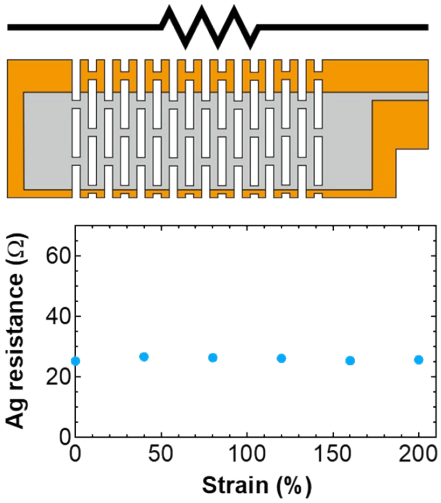

Figure S1. Ag electrode resistance on a kirigami structure of polyimide film as a function of stretching strain.

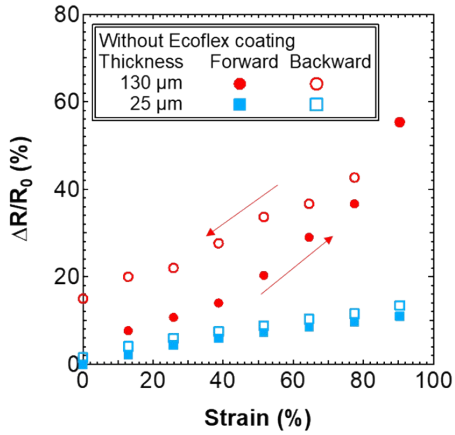

Figure S2. Normalized resistance change ratio of the graphene strain sensor without ecoflex passivation under different applied strains.

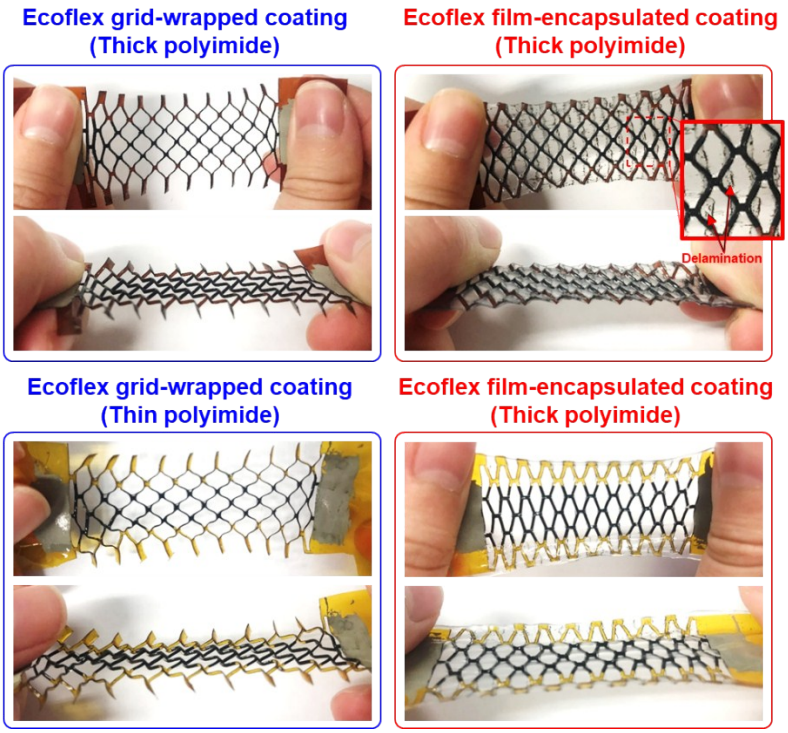

Figure S3. Photos of structural deformation of ecoflex grid-wrapped and film-encapsulated devices with different thicknesses (25 μm and 130 μm) of the polyimide under stretching condition.

Table S1. A comparison of this work with other stretchable devices

Structures	Sensing behavior	Stretching-releasing stability tests	Performance degradation? Y/N	Stretchability	References
Graphene based gauge structure	Pulse detection	20,000	N (small fluctuations)	~1.5 %	Carvalho et al.[1]
CNT-PDMS based kirigami structure		5,000	N	~400 %	Wang et al.[2]
Microcrack-graphite thin films	Motion detection, vibration wave detection etc.	2,000	N (drift at the beginning)	≥ 50 %	Amjadi et al.[3]
Rubbery strain sensors	Motion detection	<1,000	N	100 %	Kim et al.[4]
Silver-polystyrene spheres-PDMS	Motion detection	30	N	>80%	Hu et al.[5]
Graphene-polymer based kirigami structure	motion detection and perspiration monitoring	> 60,000	N (small drift)	~250 %	This work

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