1. Supplementary Tables

Table S1. A comparison of the performance of sensors based on Janus gels

No.	Janus gels	Preparation	GF	DH	Cycle stability	Ref.
1	PDMA/RSF	One-step in situ photopolymerization	GF = 2.24 (strain); 0.00732 kPa^{-1}(pressure)	4.92%	500	This work
2	PVA/PANI; PVA/PA	Freeze–thaw cycle	GF = 3.4 (strain); NA (pressure)	NA	1000	1
3	J-AuNPs@GA	Medium-guided diffusion	GF = 0.3 (strain); NA (pressure)	NA	NA	2
4	SMA/CNFs/PAM;NFs@TA/PAA	Layer-by-layer polymerization	GF = 0.3(strain); NA (pressure)	NA	200	3
5	PAAM/SDS/HMA;PAAM/Aa/Ta	Layer-by-layer polymerization	NA	NA	NA	4
6	PAA/Lignin/Ca^{2+}	Impregnation diffusion	GF = 2.51(strain); NA (pressure)	NA	NA	5

Table S2. Formula of PDMA-RSF ion-conductive gels

Ion-conductive gel	DMA (g)	[EMIM][Tf_2N] (g)	1173 (g)	PEGDA (g)	7.2wt%RSF（g）
PDMA-RSF(0.5wt%)	0.8	1.2	0.008	0.002	0.056
PDMA-RSF(1wt%)	0.8	1.2	0.008	0.002	0.111
PDMA-RSF(2wt%)	0.8	1.2	0.008	0.002	0.222
PDMA-RSF(3wt%)	0.8	1.2	0.008	0.002	0.333
PDMA-RSF(5wt%)	0.8	1.2	0.008	0.002	0.556

Table S3. Mechanical properties and adhesion strength of the Janus gels

No.	Janus gels	Preparation	Stress (kPa)	Strain (%)	Adhension strength (kPa)	Ref.
1	PDMA/RSF	One-step in situ photopolymerization	215.90	2671%	250	This work
2	PVA/PANI; PVA/PA	Freeze–thaw cycle	45.8	345.3%	1.6	1
3	ADSCH	Layer-by-layer polymerization	150	800	30	6

2. Supplementary Figures

Fig. S1. Digital photograph of ionic conductive gel prepared using [EMIM][Tf_2N] and [EMIM]Cl, respectively.

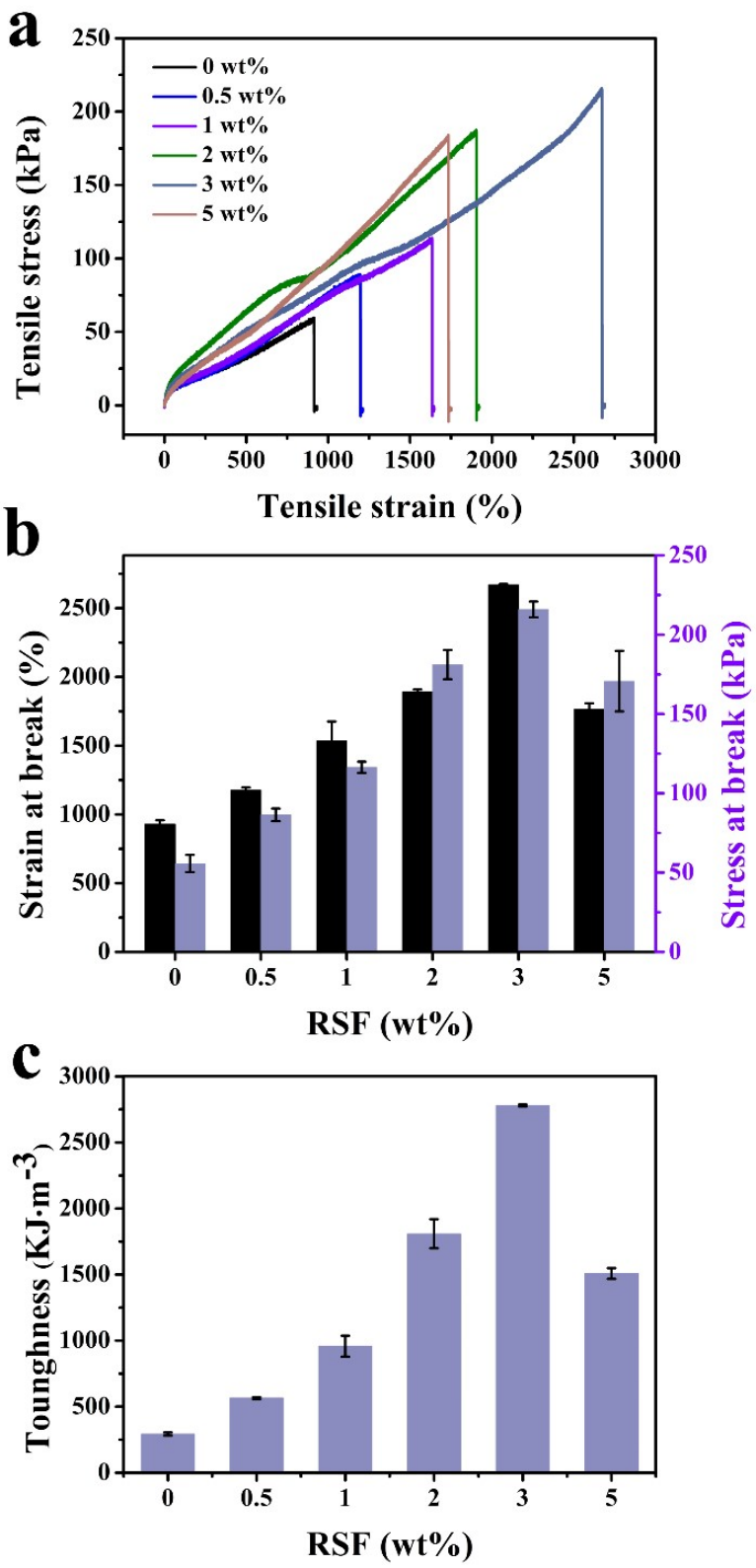

Fig. S2. (a) Tensile testing stress−strain curves, (b) stress at break and strain at break, and (c) toughness of the PDMA-RSF ion-conductive gels with various RSF contents.

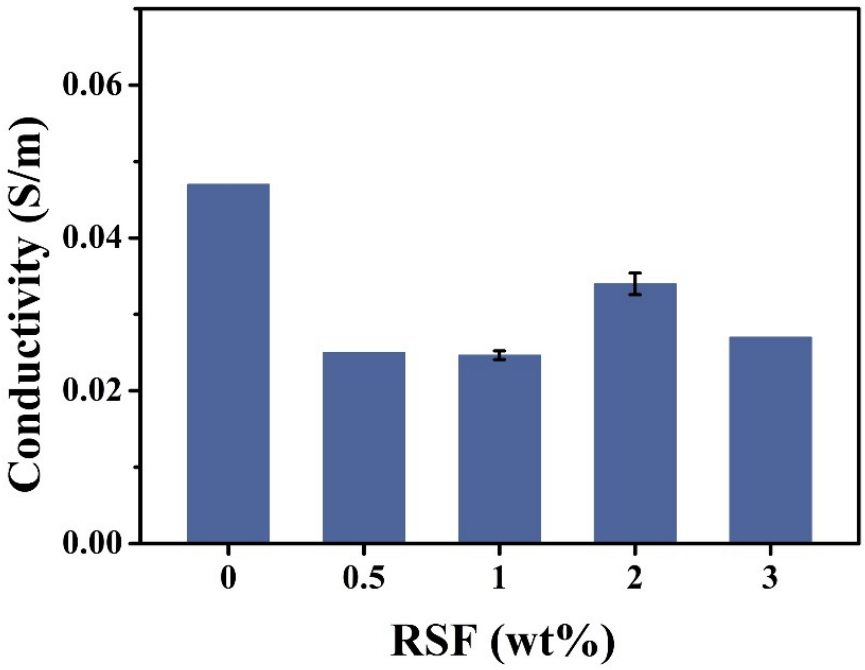

Fig. S3. Conductivity of PDMA-RSF ion-conductive gels with different RSF contents.

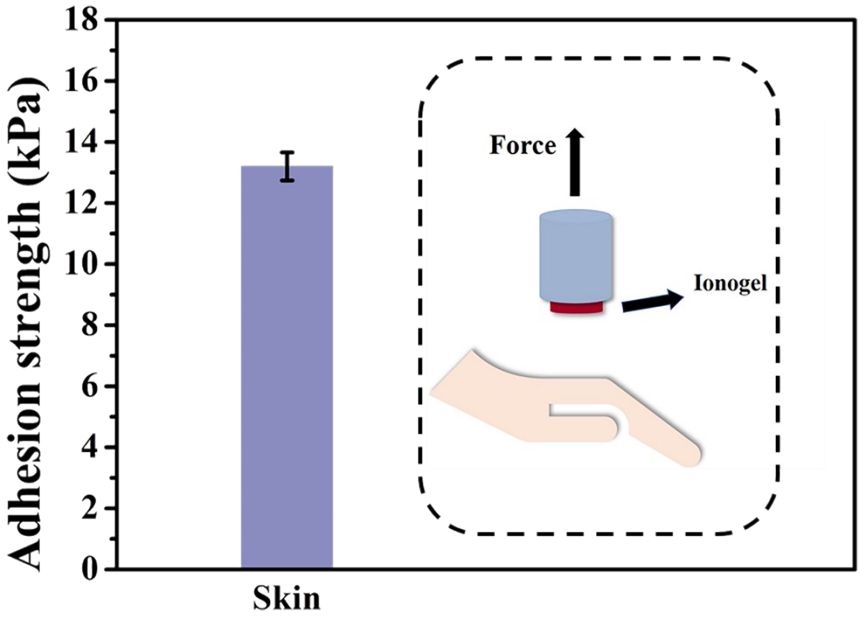

Fig. S4. Adhesion strength of PDMA-RSF ionic conductive gels to the skin.

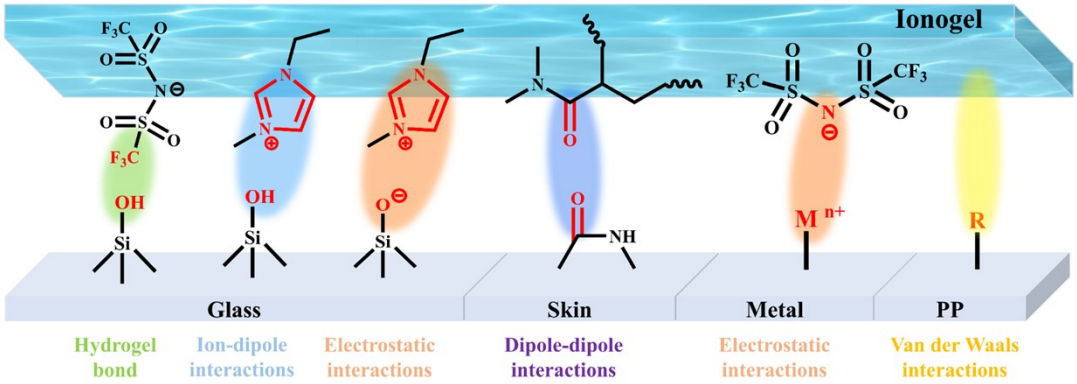

Fig. S5. Possible adhesion mechanism of PDMA-RSF ion-conductive gels on different substrate surfaces.

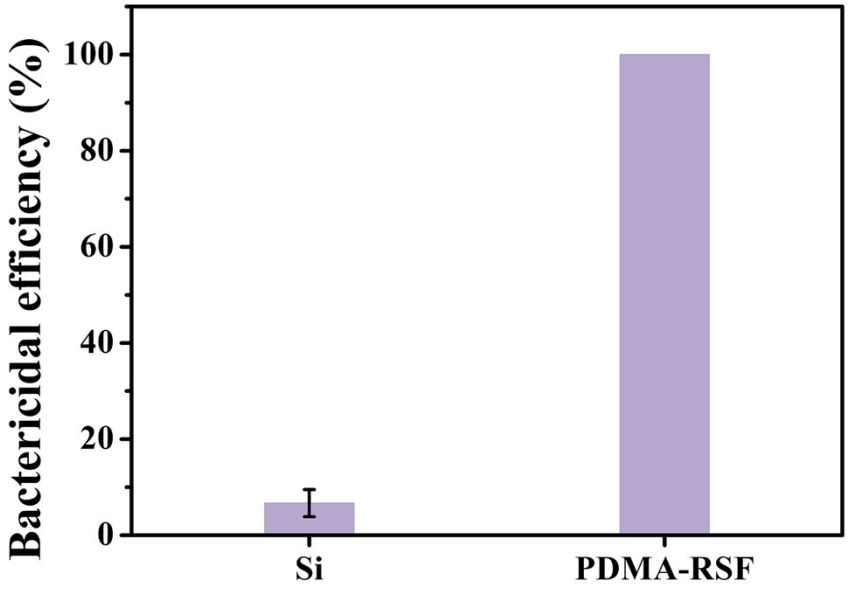

Fig. S6. Bactericidal efficiency of silicon wafers and PDMA-RSF ion-conductive gels.

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