

## Supplementary Information

# Flexible capacitive pressure sensor with hybrid porous PDMS/SA hydrogel structure for touch/pain detection

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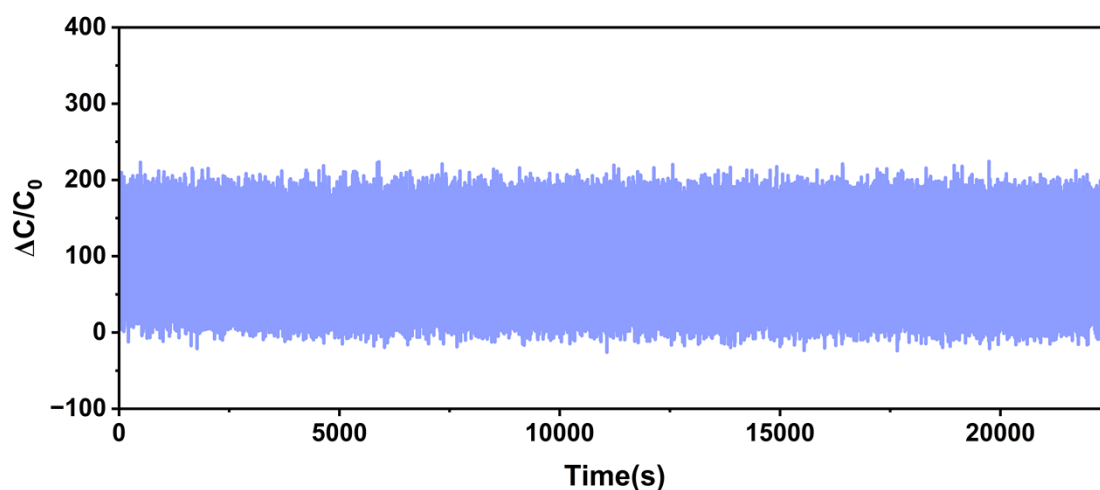


Fig. S1. 3000 repetitive response and recovery curves under 50 kPa.

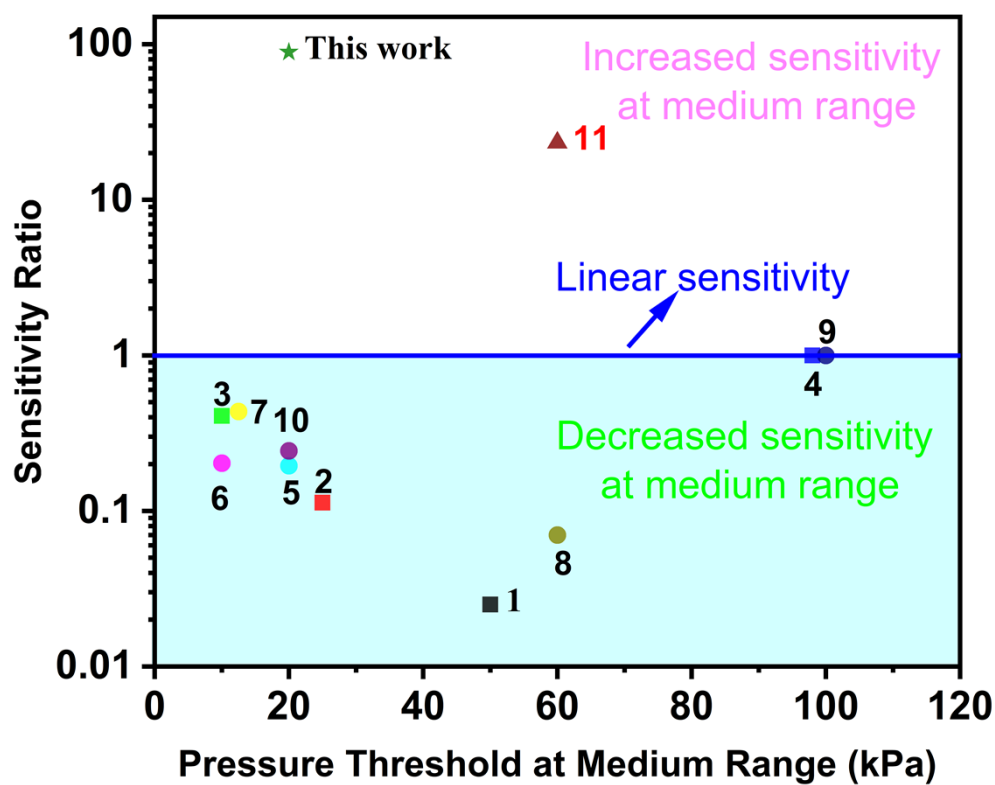
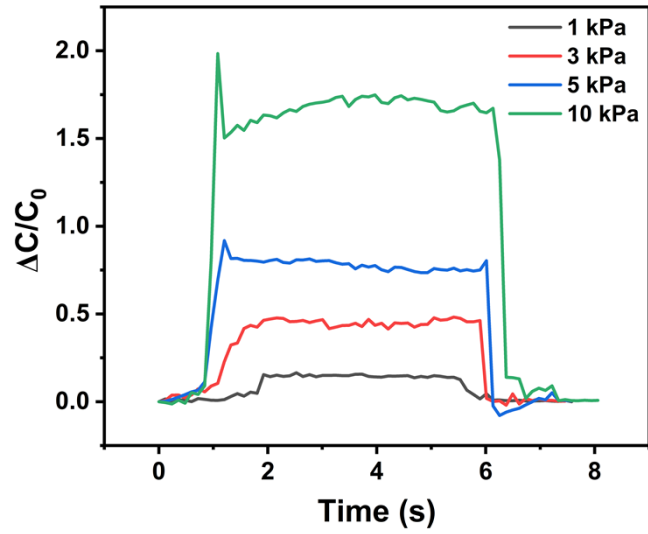


Fig. S2. Sensitivity ratio (sensitivity in the medium pressure range and low pressure range) and pressure threshold at the medium range comparisons of capacitive pressure sensors with wide pressure sensing range.



**Fig. S3.** Capacitance change of the pressure sensor at small static pressures (1 kPa, 3 kPa, 5 kPa and 10 kPa).

**Table S1.** Comparison of Capacitive Pressure Sensors with Wide Pressure Sensing Range

Pressure sensing mechanism	Sensitivity at the low pressure range (<10 kPa) (kPa <sup>-1</sup> )	Sensitivity at the medium pressure range (10–100 kPa) (kPa <sup>-1</sup> )	Sensitivity ratio (medium /low pressure)	Ref.
Parallel plate capacitance	0.16 (0–10 kPa)	0.004 (50–200 kPa)	0.025	[1]
Parallel plate capacitance	0.1261 (0–2.5 kPa)	0.0143 (25–60 kPa)	0.113	[2]
Parallel plate capacitance	1.47 (0.1–10 kPa)	0.6 (10–100 kPa)	0.408	[3]
Parallel plate capacitance	1.25 (0–98 kPa)		≈1	[4]
EDLs capacitance	9280 (2–20 kPa)	1811.4 (20–60 kPa)	0.195	[5]

EDLs capacitance	3302.9 (<10 kPa)	671.7 (10–100 kPa)	0.203	[6]
EDLs capacitance	10402.8 (0–12.5 kPa)	4536.2 (12.5–80 kPa)	0.436	[7]
EDLs capacitance	171 (0–60 kPa)	12 (60–250 kPa)	0.07	[8]
EDLs capacitance	3224.2 (0–100 kPa)		≈1	[9]
EDLs capacitance	83.9 (0–20 kPa)	20.4 (20–100 kPa)	0.243	[10]
EDLs-pseudo capacitance	216.4 (0–60 kPa)	5032.9 (60–200 kPa)	23.25	[11]
Parallel plate and EDLs capacitance	0.16 (0–20 kPa)	14.25 (20–50 kPa)	89.06	This work (weight ration = 8:1)

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