Supporting Information

Mussel-inspired Sticky Self-healing Conductive Hydrogels Composites for Physiological Electrical Sensing

Ming-Lin He[1], Nai-Feng Chen[2], Pei Xiang Wang[1], Hsin-Ya Chen[1], Wan-Yi Lai[1], Pei-Tun Liao[1], Jiashing Yu[3], Yang Wei[1], Ren-Jei Chung[1], Chun-Hsien Hsu,[4] Shiu-Jau Chen[5]*, Ting-Ting Chang[2]*, Wen-Ya Lee [1,2]*

Table S1. The summary of adhesion strength, self-healing efficiency, and conductivity of mussel-inspired hydrogels

System	Adhesion strength (kPa)	Healing efficiency	Conductivity (mS/cm)	Reference
PAM/HAC/Borax	49.6	40%	0.18 110 (Li^+)	[S1]
TA@CNC/PVA/Borax	60	92%	N/A	[S2]
PVA-PAA/PEI	11	87%	N/A	[S3]
PVA-SbQ/CNC	25	N/A	N/A	[S4]
PDA/CNT/PAA/PAM	60	N/A	82	[S5]
PAA/DA/PPy/Fe3+	~50	N/A	3.9	[S6]
L-DMA–PCL	38.4	N/A	55	[S7]
PVA/PDAP/Borax	121	91.2%	38	This work

[S1] *Macromol. Rapid Commun. 2020, 41,1900450.*

[S2] *ACS Appl. Mater. Interfaces, 2019, 11.6: 5885-5895.*

[S3] *Polymer, 2020, 206: 122845.*

[S4] *Macromol. Mater.Eng., 2020, 305.1: 1900623.*

[S5] *Adv. Funct. Mater.* 2018, *28*, 1704195

[S6] *J. Mater. Chem. B,* 2021,9, 2221-2232

[S7] *J. Colloid Interface Sci.*, 2021, 585, 420

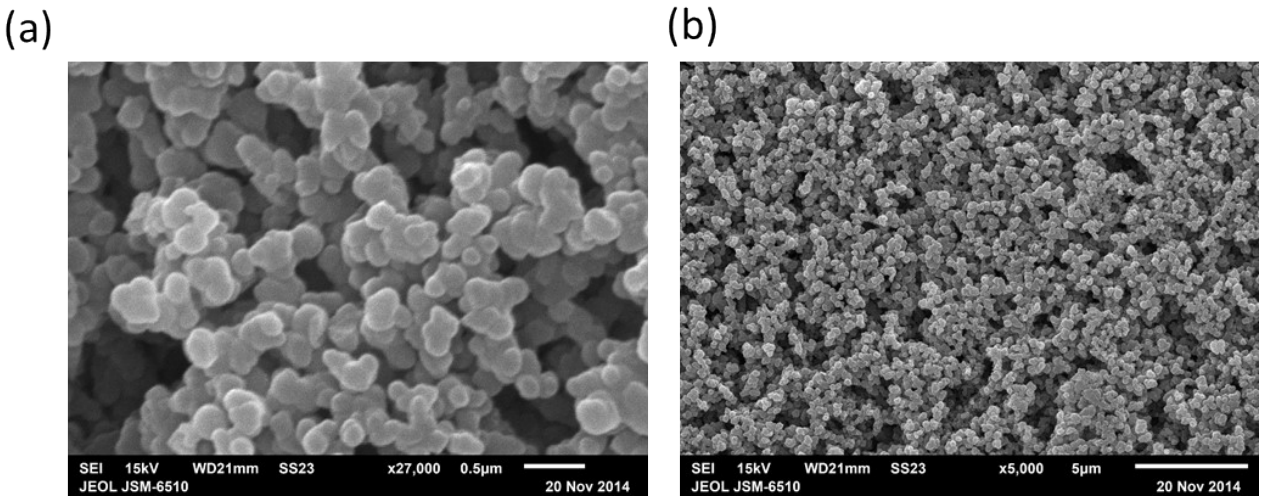

Figure S1. SEM images of (a,b) PDAP at different magnifications.

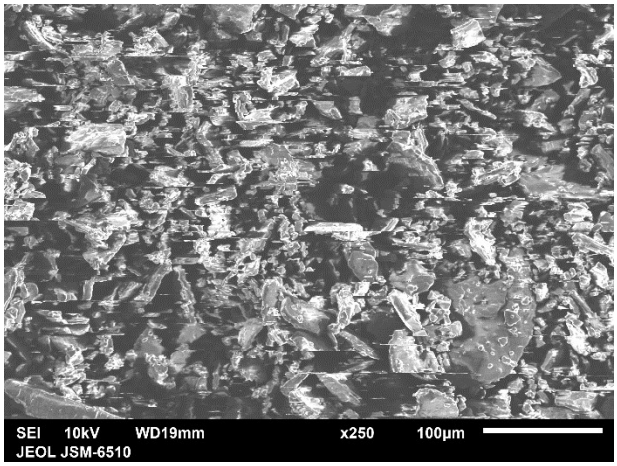

Figure S2. SEM image of the unpolymerized dopamine hydrochloride.

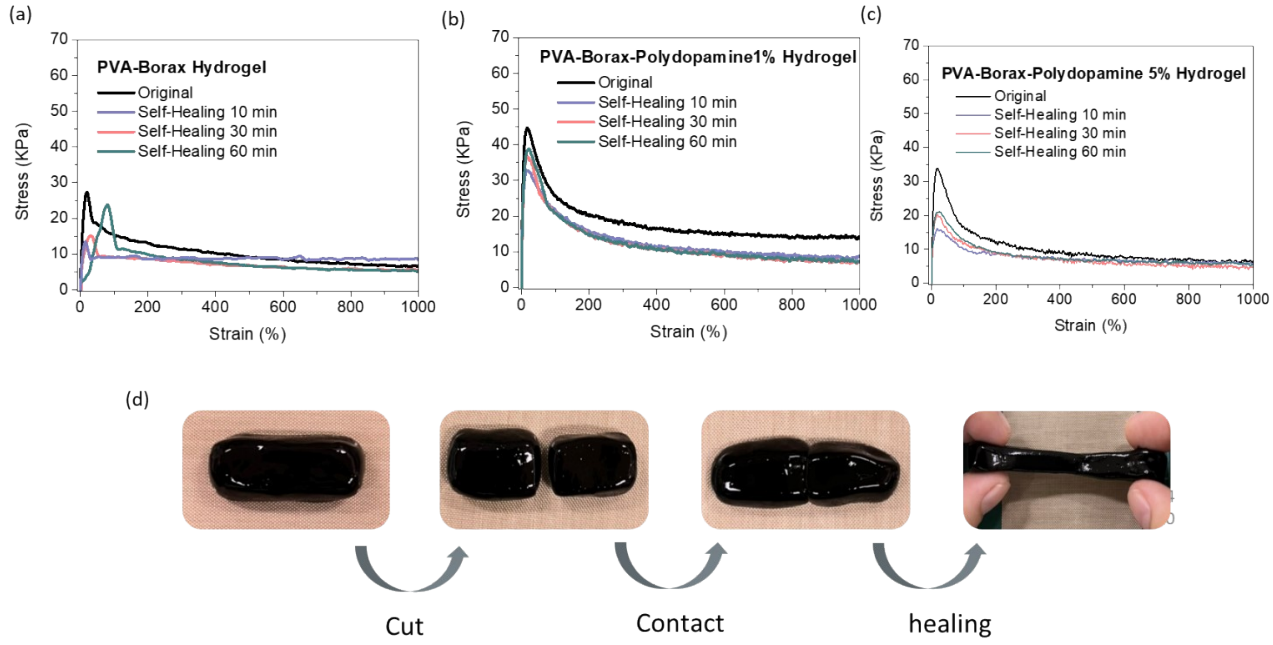

Figure S3. (a-c) Stress-strain curves of the hydrogel adhesives with various amount of PDAPs. (d). Demonstration of self-healing properties in a PVA/Borax/PDAP hydrogel.

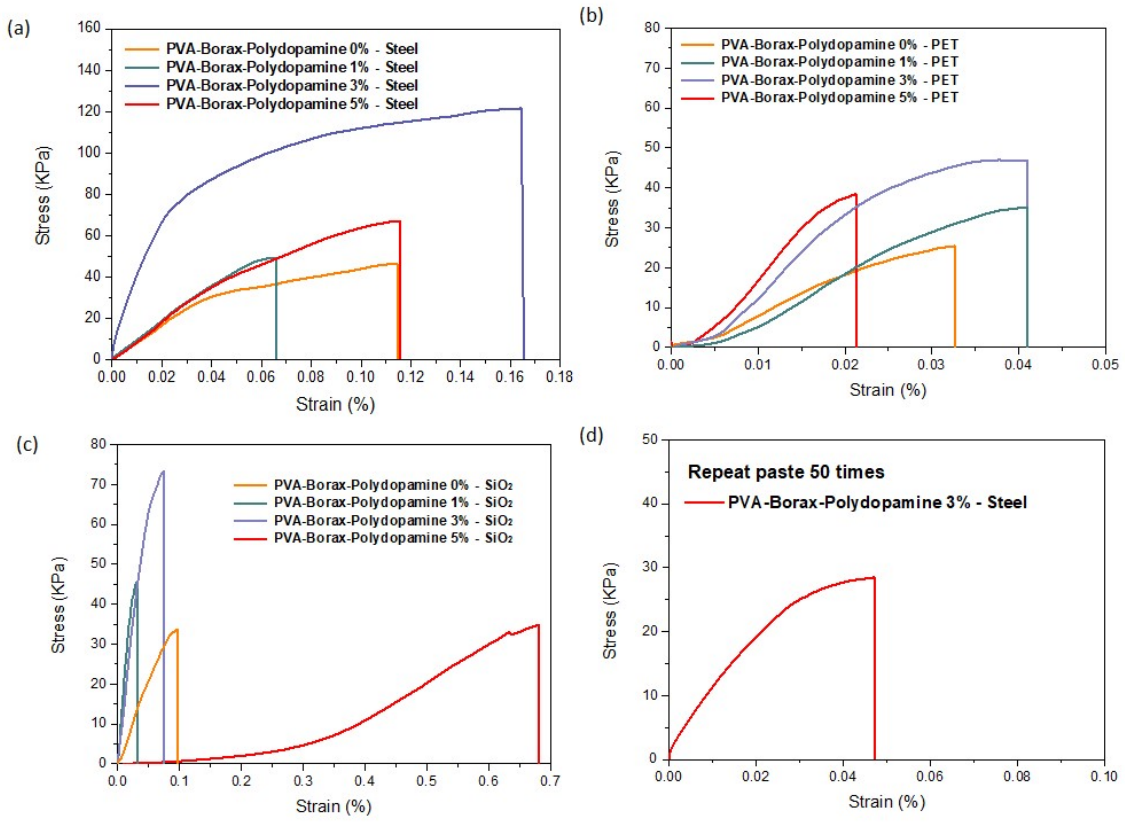

Figure S4. Tensile stress-strain curves for (a-c) the adhesion strength of the hydrogel with different concentrations of PDAPs to different substrates and (d) 3wt % hydrogel after 50 times repeatedly paste/peel cycles.

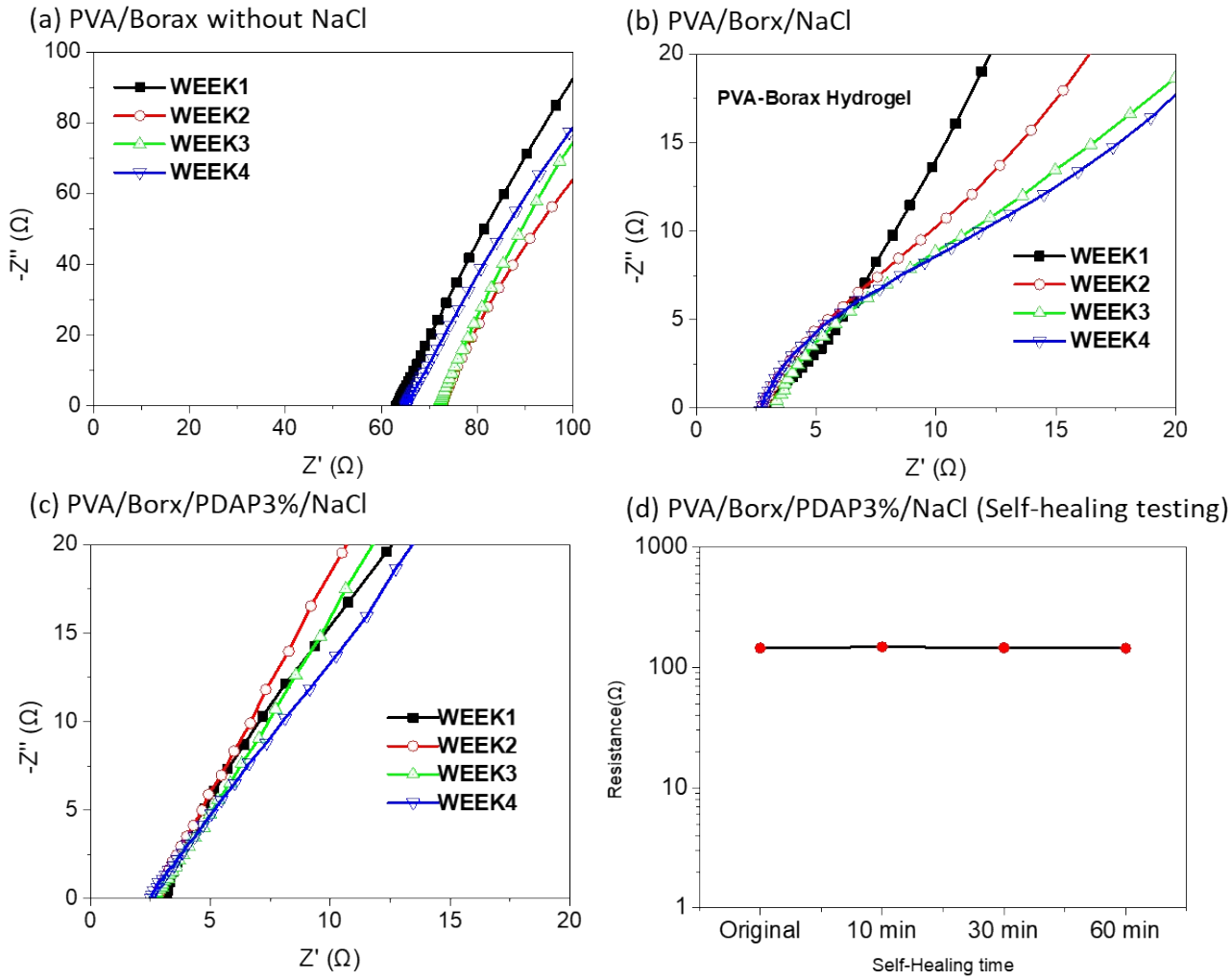

Figure S5. (a-c) Nyquist plots of the conductive hydrogel adhesive along with time; (d) Resistance recovery of the conductive hydrogel adhesives after cutting.

sketch_mar24a

```
void setup() {
  // initialize the serial communication:
  Serial.begin(9600);
  pinMode(10, INPUT); // Setup for leads off detection LO +
  pinMode(11, INPUT); // Setup for leads off detection LO -

}

void loop() {

  if((digitalRead(10) == 1)||(digitalRead(11) == 1)){
    //Serial.println('!');
  }
  else{
    // send the value of analog input 0:
      Serial.println(analogRead(A0));
  }
  //Wait for a bit to keep serial data from saturating
  delay(1);
}
```

Figure S6. Codes of the Arduino UNO microcontroller with AD8232 module.