

Supplementary Information

Table S1 Prominent OES spectrum peaks for plasma jet reactor with 90:10 Ar: Air gas feed

Ion	Wavelength, λ (nm)
N ₂	379
N ₂	399
N ₂	405
Ar	696
Ar	750
Ar	763
Ar	772
Ar	800
Ar	811
Ar	826
Ar	841

Table S2. Colorimetry results of DW-FBPI gels

	L*		a*		b*	
Gelling Conditions	Control	Treated	Control	Treated	Control	Treated
95°C - 30 min	73.92 ± 0.67 ^a	79.32 ± 0.8 ^b	0.18 ± 1.15 ^a	-0.59 ± 0.16 ^a	19.28 ± 0.92 ^a	17.77 ± 0.57 ^a
85°C - 30 min	78.62 ± 0.62 ^a	78.55 ± 0.50 ^a	-0.87 ± 0.34 ^a	-0.71 ± 0.39 ^a	15.79 ± 0.68 ^a	16.16 ± 1.08 ^a
85°C - 1 h	77.69 ± 0.70 ^a	78.13 ± 0.25 ^a	-0.84 ± 0.43 ^a	-0.83 ± 0.17 ^a	16.07 ± 0.56 ^a	17.12 ± 1.36 ^a
80°C - 1 h	78.26 ± 1.87 ^a	77.57 ± 0.36 ^a	-0.45 ± 0.39 ^a	-0.55 ± 0.20 ^a	16.05 ± 0.92 ^a	15.85 ± 0.08 ^a

Values are expressed as the mean ± the standard deviation of three replicates. 1-way ANOVA was completed with the Tukey Test as post-hoc test. The alphabetical subscript (a,b) within each row and section indicates the values that are significantly different between control and treated ($p < 0.05$).

Table S3. ΔE values of DW-FBPI and DES-FBPI gels

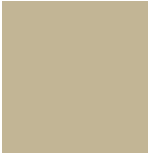

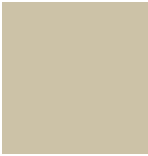



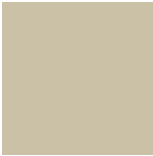





Sample	Gelling Conditions	Control	Treated	ΔE
DW-FBPI	95°C - 30 min			5.73 ± 1.28
DW-FBPI	85°C - 30 min			1.69 ± 0.93
DW-FBPI	85°C - 1 h			0.74 ± 0.36
DW-FBPI	80°C - 1 h			1.56 ± 0.41
DES-FBPI	80°C - 1 h			2.44 ± 0.94
DES-FBPI	79°C - 1 h			1.73 ± 1.10

Table S4. Colorimetry results of DES-FBPI gels

	L*		a*		b*	
Gelling Conditions	Control	Treated	Control	Treated	Control	Treated
80°C - 1h	69.8 ± 0.8 ^a	67.5 ± 1.3 ^a	-0.06 ± 0.22 ^a	-0.18 ± 0.31 ^a	13.6 ± 0.4 ^a	12.7 ± 0.4 ^b
79°C - 1h	71.4 ± 1.2 ^a	71.2 ± 1.5 ^a	-1.19 ± 0.32 ^a	-1.17 ± 0.19 ^a	14.9 ± 0.7 ^a	14.9 ± 0.5 ^a

Values are expressed as the mean ± the standard deviation of three replicates. 1-way ANOVA was completed with Tukey Test as post-hoc test. The alphabetical subscript (a,b) within each columnar section indicates the values that are significantly different between control and treated (p<0.05).

Table S5. Water holding capacity of DW-FBPI and DES-FBPI gels heated at various temperatures

Sample	Gelling Conditions	Treated (%)	Control (%)
DW-FBPI	85°C 1 h	88.7 ± 4.5 ^{a, A}	85.4 ± 3.6 ^{a, A}
DW-FBPI	80°C 1 h	94.0 ± 3.6 ^{a, B}	93.6 ± 1.1 ^{a, B}
DES-FBPI	95°C 30 min	82.0 ± 3.3 ^{a, A}	77.3 ± 2.5 ^{a, A}
DES-FBPI	85°C 30 min	91.5 ± 1.9 ^{a, B}	89.7 ± 6.0 ^{a, B}
DES-FBPI	80°C 1 h	99.0 ± 0.0 ^{a, A}	98.6 ± 0.1 ^{a, A}
DES-FBPI	79°C 1 h	99.0 ± 0.0 ^{a, A}	99.2 ± 0.6 ^{a, A}

Values are expressed as the mean ± the standard deviation of three replicates. 2-way ANOVA was completed with the Tukey Test as post-hoc test. The first alphabetical subscript (a,b) within each columnar section indicates the values that are significantly different between control and treated ($p < 0.05$). The second alphabetical subscript (A, B) indicates a significant difference between gelling conditions. ($p < 0.05$)

Table S6 Power law parameters from equations (4) and (5) from treated DW-FBPI gels

Temperature	Gelling time	Sample	G_o' (kPa)	n_o'	G_o'' (kPa)	n_o''
95°C	30 min	Treated	$7.02 \pm$	$0.115 \pm$	$1.56 \pm$	$0.111 \pm$
			$2.28^{a, A}$	$0.003^{a, A}$	$0.49^{a, A}$	$0.007^{b, B}$
	30 min	Control	$4.16 \pm$	$0.114 \pm$	$0.87 \pm$	$0.119 \pm$
			$0.47^{b, A}$	$0.004^{ab, A}$	$0.11^{b, A}$	$0.006^{ab, B}$
85°C	30 min	Treated	$2.53 \pm$	$0.106 \pm$	$0.51 \pm$	$0.123 \pm$
			$0.94^{b, B}$	$0.002^{b, B}$	$0.18^{b, B}$	$0.001^{ab, A}$
	30 min	Control	$2.86 \pm$	$0.105 \pm$	$0.57 \pm$	$0.124 \pm$
			$1.10^{b, B}$	$0.006^{b, B}$	$0.20^{b, B}$	$0.004^{a, A}$
85°C	1 h	Treated	$3.16 \pm$	$0.106 \pm$	$0.62 \pm$	$0.123 \pm$
			$0.39^{a*, A}$	$0.002^{a, A}$	$0.08^{a, A}$	0.002^{aA}
	1 h	Control	$2.46 \pm$	$0.105 \pm$	$0.49 \pm$	$0.125 \pm$
			$0.08^{b*, A}$	$0.01^{a, A}$	$0.01^{b, A}$	0.005^{aA}

80°C	1 h	Treated	1.19 ±	0.120 ±	0.28 ±	0.137 ±
			0.23 ^{c*, B}	0.001 ^{b, B}	0.05 ^{c, B}	0.003 ^{bB}
	1 h	Control	1.36 ±	0.122 ±	0.32 ±	0.139 ±
			0.09 ^{c*, B}	0.003 ^{b, B}	0.02 ^{c, B}	0.003 ^{bB}

Values are expressed as the mean ± the standard deviation of three replicates. 2-way ANOVA was completed with Tukey Test as post-hoc test. The first alphabetical subscript (a,b) within each column indicates the values that are significantly different (p<0.05). The second alphabetical subscript (A,B) indicates a significant difference between gel temperatures. (p<0.05)

Table S7 Power law parameters from equations (4) and (5) from treated DES-FBPI gels heated
for 1 h

Sample	Gelling Conditions	G_o' (kPa)	n_o'	G_o'' (kPa)	n_o''
Treated – 30 min PAW	80°C	1.03 ± 0.20^a	$0.120 \pm$ 0.006^a	0.22 ± 0.04^a	$0.149 \pm$ 0.005^a
Control	80°C	1.03 ± 0.44^a	$0.122 \pm$ 0.003^a	0.23 ± 0.09^a	$0.153 \pm$ 0.006^a
Treated – 8 min PAW	79°C	0.61 ± 0.09^a	$0.153 \pm$ 0.006^a	0.16 ± 0.02^a	$0.172 \pm$ 0.002^a
Control	79°C	0.39 ± 0.04^b	$0.151 \pm$ 0.004^b	0.10 ± 0.02^b	$0.170 \pm$ 0.002^b

Values are expressed as the mean \pm the standard deviation of three replicates. 1-way ANOVA was completed with Tukey Test as post-hoc test. The alphabetical subscript (a,b) within each column indicates the values that are significantly different between control and treated ($p < 0.05$).

Table S8 Measured shape data of treated DW-FBPI 3D printed structures.

Gel Temperature (°C)	Treatment	Bottom: Top Ratio	Bottom: Top Ratio, after 24 h	Bottom Area	Bottom Area after 24 h
85°C for 1 h	Control	1.16 ± 0.08 ^a	1.17 ± 0.08 ^a	9.866 ± 0.591 ^a	9.618 ± 0.715 ^a
	Treated	1.13 ± 0.01 ^a	1.17 ± 0.03 ^a	9.626 ± 0.522 ^a	9.674 ± 0.412 ^a
85°C for 30 min	Control	1.16 ± 0.04 ^a	1.17 ± 0.04 ^a	9.886 ± 0.925 ^a	9.687 ± 0.582 ^a
	Treated	1.14 ± 0.03 ^a	1.19 ± 0.02 ^a	10.009 ± 0.526 ^a	9.956 ± 0.457 ^a
80°C for 1 h	Control	1.20 ± 0.03 ^a	1.20 ± 0.03 ^a	10.208 ± 0.305 ^a	9.900 ± 0.140 ^a
	Treated	1.20 ± 0.05 ^a	1.18 ± 0.03 ^a	9.879 ± 0.546 ^a	10.091 ± 0.586 ^a

Values are expressed as the mean ± the standard deviation of three replicates. 1-way ANOVA was completed with Tukey Test as post-hoc test. The alphabetical subscript (a,b) within each gel temperature indicates the values that are significantly different between control and treated (p<0.05).

Table S9 Measured shape data of treated DES-FBPI 3D printed structures.

Gel Temperature (°C)	Treatment	Bottom: Top Ratio	Bottom: Top Ratio, after 24 hours	Bottom Area	Bottom Area after 24 hours
80°C for 1 h	Control	1.17 ± 0.03^a	1.24 ± 0.04^a	8.413 ± 0.584^a	8.416 ± 0.370^a
	Treated	1.17 ± 0.05^a	1.25 ± 0.04^a	8.468 ± 0.754^a	8.650 ± 0.561^a
79°C for 1 h	Control	1.31 ± 0.06^a	1.43 ± 0.13^a	8.766 ± 0.343^a	9.001 ± 0.563^a
	Treated	1.33 ± 0.06^a	1.39 ± 0.11^a	8.668 ± 0.743^a	8.665 ± 0.448^a

Values are expressed as the mean \pm the standard deviation of three replicates. 1-way ANOVA was completed with Tukey Test as post-hoc test. The alphabetical subscript (a,b) within each gel temperature indicates the values that are significantly different between control and treated ($p < 0.05$).

