

Supporting Information

Amylase-Responsive Bilayer Film for Sustained Enzyme Delivery and ROS-Scavenging Therapy in Oral Ulcer Treatment

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AUTHOR INFORMATION

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Results

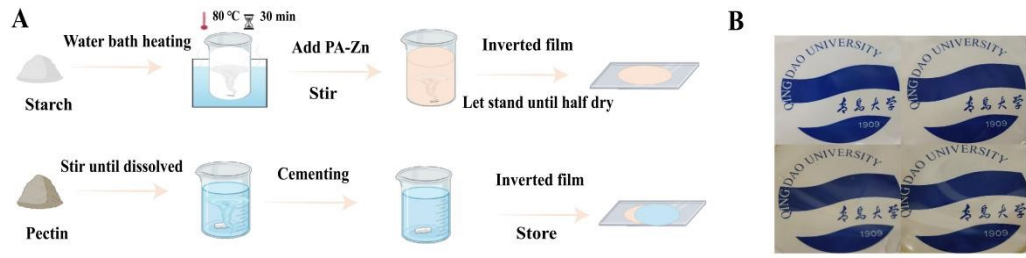


Figure S1. Preparation of PZ/SP (A), and optical image (B) of films.

Table S1. Color analysis of SP, PZ²/SP, PZ⁴/SP, and PZ⁶/SP

Group	K/S	L	a	b
SP	0.16 ± 0.01 ^e	86.39 ± 0.28 ^a	2.24 ± 0.02 ^c	2.39 ± 0.20 ^e
PZ ² /SP	0.36 ± 0.03 ^d	84.05 ± 0.70 ^b	0.64 ± 0.21 ^e	13.16 ± 0.31 ^c
PZ ⁴ /SP	0.50 ± 0.04 ^c	81.30 ± 0.80 ^c	0.90 ± 0.29 ^d	15.20 ± 1.05 ^b
PZ ⁶ /SP	1.01 ± 0.05 ^b	77.30 ± 0.39 ^d	2.71 ± 0.08 ^b	21.03 ± 0.60 ^a

Table S2. Analysis of water permeability, oxygen permeability, thickness, water content, solubility and expansion performance of SP, PZ²/SP, PZ⁴/SP, PZ⁶/SP

Group	Thickness(mm)	Moisture content (%)	Solubility(%)	Swellability(%)	WVP*10 ⁻¹² (g/cm h Pa)	OP (cm ³ /m ² *min)
SP	0.09 ± 0.03 ^a	24.96 ± 0.73 ^a	97.18 ± 0.78 ^a	1.67 ± 0.07 ^a	5.99 ± 0.03 ^a	6.70 ± 0.11 ^a
PZ ² /SP	0.11 ± 0.12 ^a	21.15 ± 0.67 ^b	97.05 ± 0.50 ^a	1.65 ± 0.08 ^a	5.68 ± 0.05 ^b	5.96 ± 0.09 ^b
PZ ⁴ /SP	0.13 ± 0.05 ^a	17.97 ± 0.88 ^c	96.89 ± 0.45 ^a	1.64 ± 0.06 ^a	5.40 ± 0.09 ^c	5.33 ± 0.14 ^c
PZ ⁶ /SP	0.15 ± 0.04 ^a	15.56 ± 0.37 ^d	96.71 ± 0.71 ^a	1.63 ± 0.02 ^a	5.06 ± 0.10 ^d	4.74 ± 0.18 ^d

Table S3. Cumulative loss and apparent retention rates of PA-Zn loaded PZ/SP bilayer films after 150 min of simulated salivary rinsing

Group	Initial loading capacity(mg)	Cumulative loss volume(mg)	Apparent retention rate(%)
PZ ² /SP	10.0	0.073 ± 0.012 ^b	99.27 ± 0.12 ^b
PZ ⁴ /SP	20.0	0.062 ± 0.015 ^b	99.69 ± 0.08 ^a

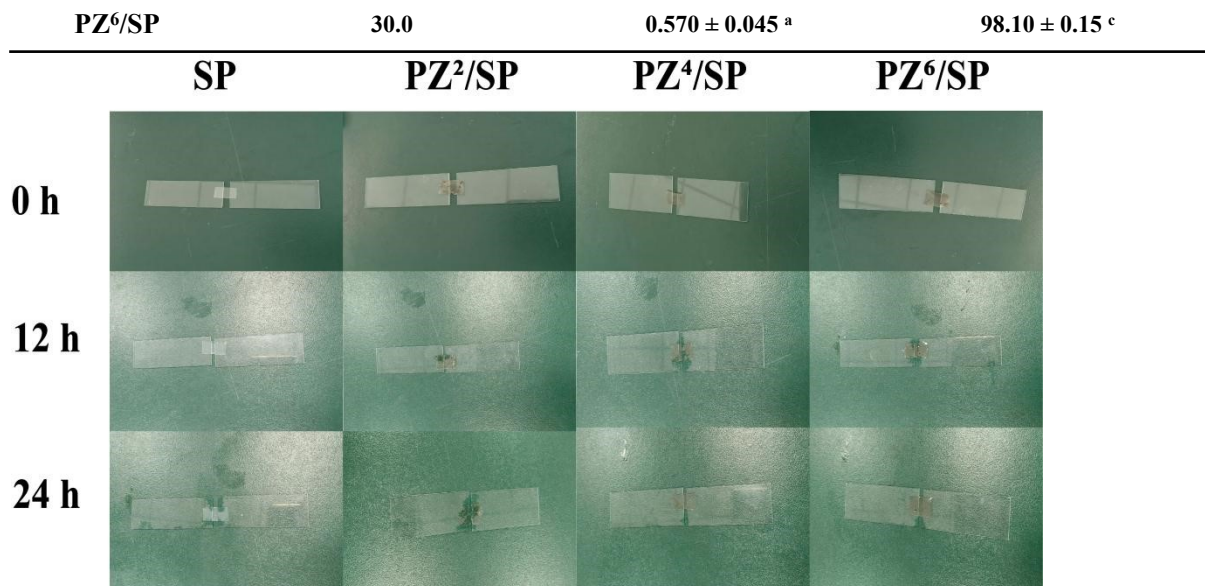


Figure S2. Structural integrity and interfacial stability of PZ/SP bilayer films in simulated saliva. Representative photographs at 0, 12, and 24 h immersion showing no delamination across all PA-Zn loadings.

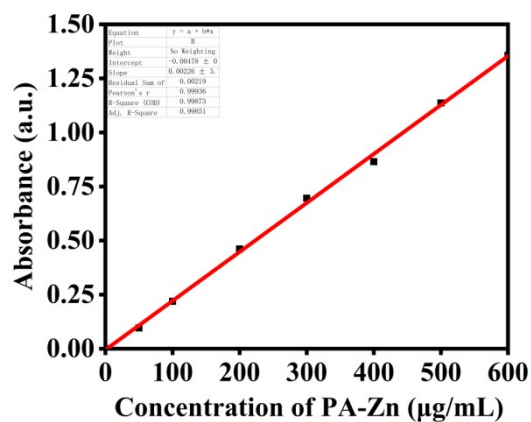


Figure S3. Standard curve of nanoenzyme absorbance with different standard concentrations.

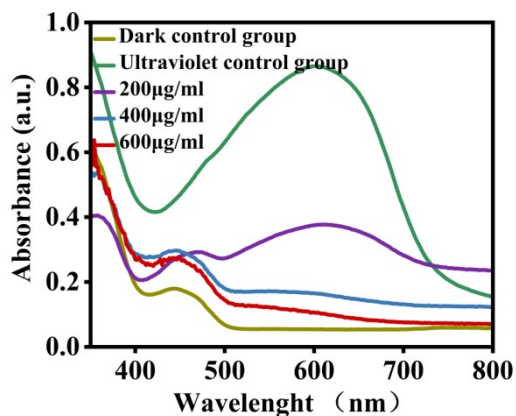


Figure S4. SOD enzyme-like activity of pure PA-Zn enzyme solution at different concentrations.

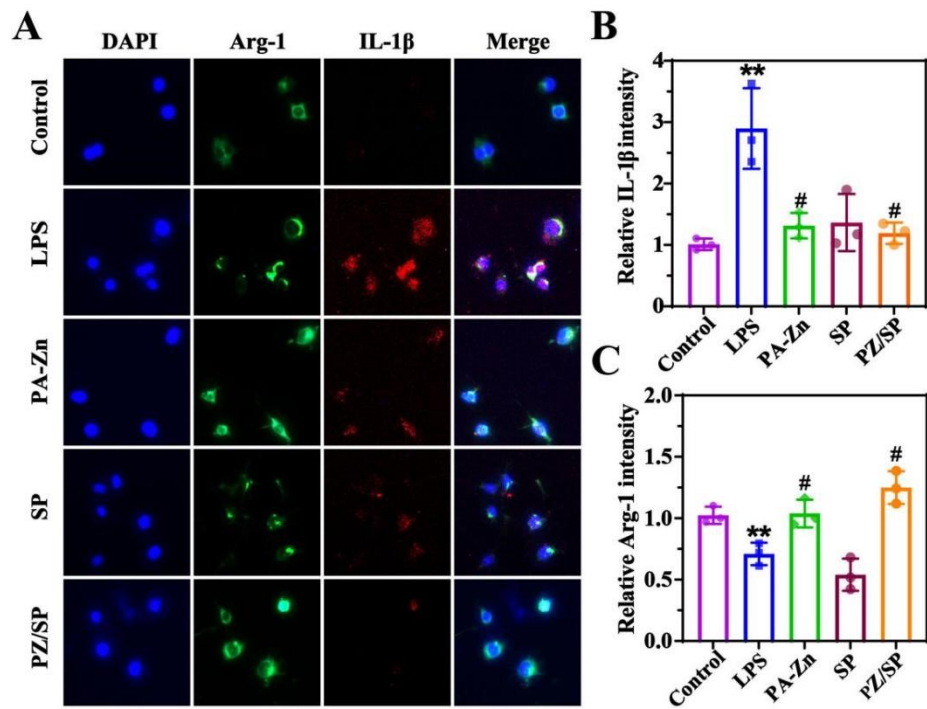


Figure S5. PZ/SP bilayer film induces in vitro polarization of RAW264.7 cells. Immunofluorescence images of IL-1 β and Arg-1 in incubated macrophages (A) versus a representative analysis of Arg-1 (B) and IL-1 β (C). Among them, * is compared with the blank group, ** $P < 0.01$, *** $P < 0.001$, # is compared with the injury group, # $P < 0.005$, # $P < 0.01$. Data presented as mean \pm SD. (n = 3 /group).