Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information

Constructing peptide-based artificial hydrolase with customized selectivity

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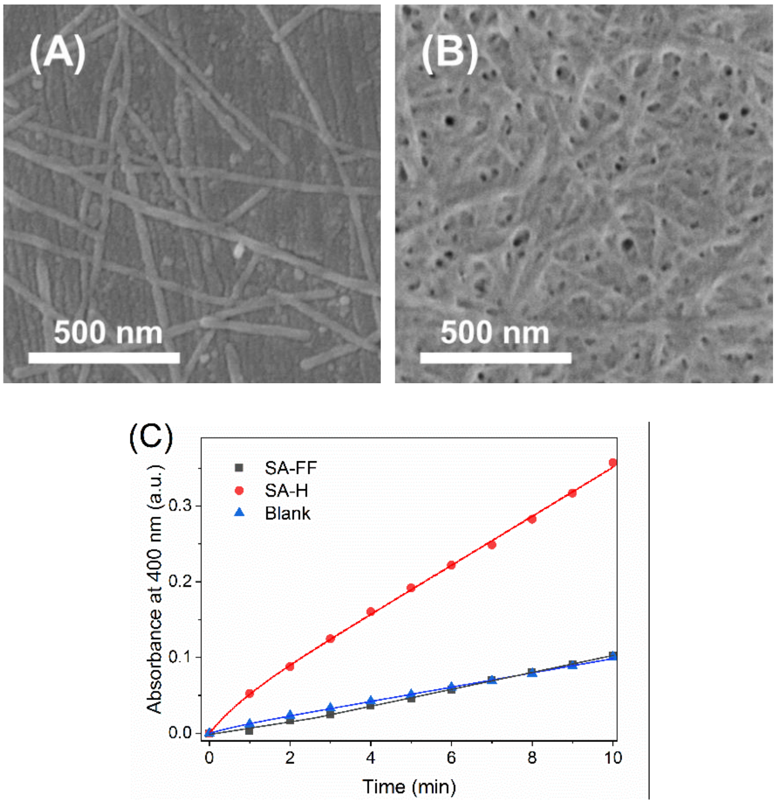

Figure S1. SEM images of (A) SA-FF and (B) SA-H. (C) Plots of absorbance at 400 nm vs time for the hydrolysis of *p*-NPA.

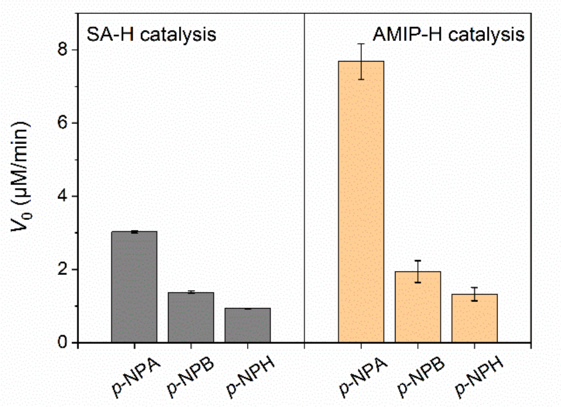

Figure S2. The hydrolytic rates of SA-H (left) and AMIP-H (right) toward *p*-NPA, *p*-NPB and *p*-NPH.

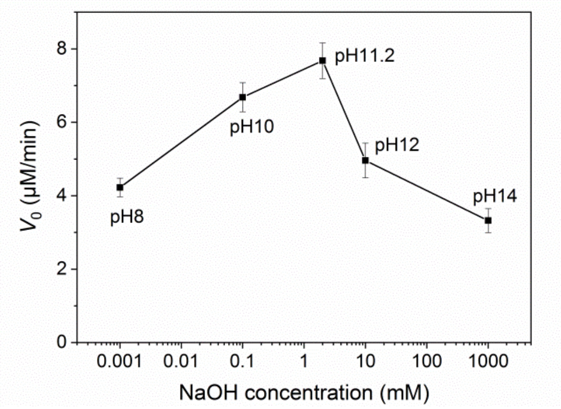

Figure S3. The catalytic activity (V_0) of AMIP-H that washed by different concentration/pH of NaOH solution.

The highest catalytic activity of AMIP-H was obtained when using 2 mM of NaOH solution (pH11.3) as elution solution. When the concentration of eluent is lower than 2 mM (pH<11.3), imprinting template cannot be completely removed and the catalytic activity of AMIP-H is unfavorable. When increasing the concentration of eluent (pH>11.3), the polymer is destroyed under the high alkaline condition, which also decreases the catalytic activity. As a result, 2 mM of NaOH solution was used to elute imprinting templates.

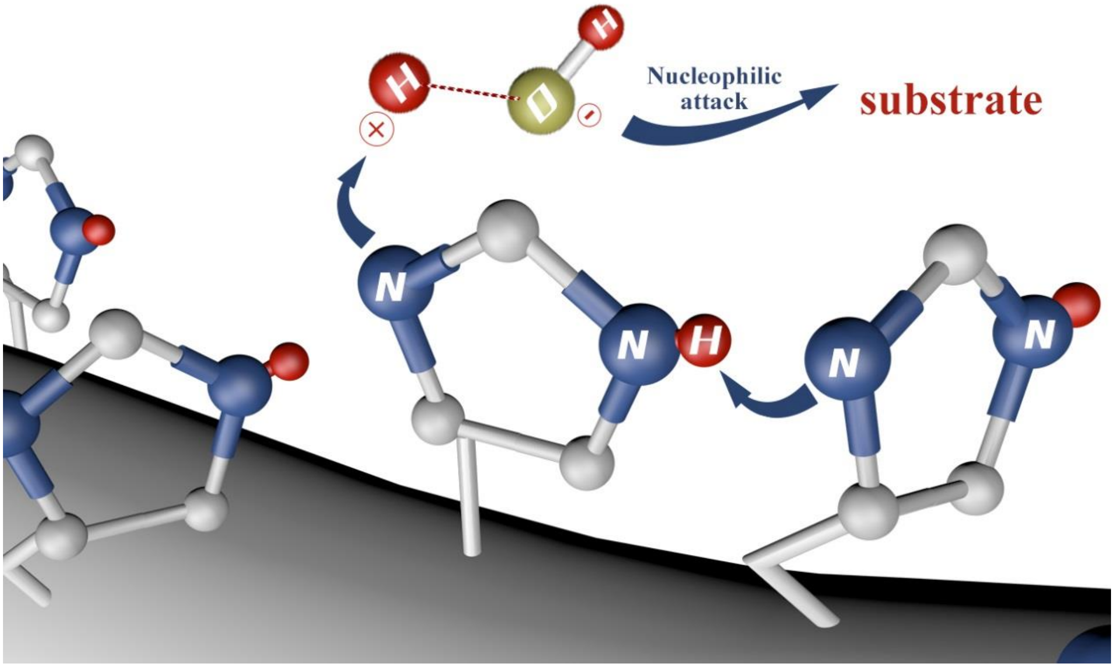

Figure S4. The catalytic mechanism of peptide nanofibers.

Table S1. Catalytic parameters of the SA-H and other imprinted hydrogels for hydrolysis of *p*-NPA, *p*-NPB and *p*-NPH[a]

Substrate	**Enzyme**	V_{max} (μM/min)	k_{cat} ($10^{-3}min^{-1}$)	K_m (mM)	k_{cat}/K_m ($10^{-3}min^{-1}$ mM^{-1})
p-NPA	SA-H	20.2 ± 1.71	4.04 ± 0.34	7.79 ± 0.70	5.27 ± 0.82
	NIP-H	17.6 ± 1.53	3.56 ± 0.56	4.28 ± 0.70	8.38 ± 0.43
	AMIP-H	20.6 ± 0.82	4.12 ± 0.16	2.66 ± 0.28	15.5 ± 0.40
	BMIP-H	16.9 ± 1.38	3.68 ± 0.28	5.96 ± 0.60	6.27 ± 0.47
	HMIP-H	14.7 ± 1.67	3.58 ± 1.02	4.86 ± 0.59	7.36 ± 0.44
p-NPB	SA-H	5.61 ± 0.35	1.12 ± 0.41	3.74 ± 0.85	3.34 ± 0.33
	NIP-H	3.17 ± 0.48	0.64 ± 0.09	1.04 ± 0.27	6.54 ± 0.30
	AMIP-H	5.44 ± 1.67	0.89 ± 0.33	1.14 ± 0.22	7.84 ± 0.43
	BMIP-H	3.93 ± 0.70	0.79 ± 0.14	0.83 ± 0.29	11.2 ± 0.58
	HMIP-H	3.63 ± 0.26	0.35 ± 0.03	0.96 ± 0.09	7.85 ± 0.23
p-NPH	SA-H	3.31 ± 0.69	0.66 ± 0.14	3.55 ± 0.17	1.93 ±0.29
	NIP-H	4.54 ± 0.63	0.91 ± 0.19	3.81 ± 0.27	2.63 ± 0.27
	AMIP-H	4.79 ± 0.45	0.96 ± 0.09	2.55 ± 0.28	3.84 ± 0.37
	BMIP-H	4.24 ± 0.22	0.85 ± 0.13	2.61 ± 0.37	3.87 ± 0.44
	HMIP-H	1.92 ± 0.08	0.35 ± 0.05	0.62 ± 0.06	5.65 ± 0.27

[a]V_{max} is the maximal reaction velocity, k_{cat} is the catalytic constant, $k_{cat} = V_{max}/[E]$, $[E]$ is the molar concentration of Fmoc-FFH, and K_m is the Michaelis constant,

Table S2. Comparison of hydrolytic activity of some peptide-based artificial enzymes.

Catalyst	**Substrate**	**Conditions**[a]	V_0 (μM/min)[a]	**Reference**
Au@E3H15	*p*-NPA	Tris-HCl buffer pH 7.3, 25 °C C_{pep} = 0.05 mM C_{sub} = 0.5 mM	0.54	Mikolajczak *et al.*[1]
Q11R/H	*p*-NPA	PBS buffer pH 7.4, 25 °C C_{pep} = 0.2 mM C_{sub} = 0.5 mM	0.85	Zhang *et al.*[2]
PepNTs-His-Arg	*p*-NPA	HEPES buffer pH 8.0, 25 °C C_{pep} = 0.1 mM C_{sub} = 0.5 mM	2.44	Huang *et al.*[3]
CNT–(SHE/W)$_{2:1}$–LKLKLKL	*p*-NPA	Tris-HCl buffer pH 8.0, 37 °C C_{pep} = 3.5 μg/mL C_{sub} = 2.6 mM	1.32	Zhang *et al.*[4]
D/H/S	*p*-NPA	PBS buffer pH 7.4 C_{pep} = 0.1 mM C_{sub} = 1 mM	1.71	Gulseren *et al.*[5]
SA-H	*p*-NPA	HEPES buffer pH 7.5, 35 °C C_{pep} = 0.5 mM C_{sub} = 5 mM	11.52	Wang *et al.*[6]
AMIP-H	*p*-NPA	PBS buffer pH 8.0, 25 °C C_{pep} = 0.5 mM C_{sub} = 1 mM	7.68	**This study**

[a]The reaction conditions and V_0 values are cited directly from the original reference.

References

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