Nanoporous PtFe surface alloy architecture for enhanced methanol electro-oxidation

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Before dealloying

Element	Wt.%	At.%
AI	45.1	80.1
Fe	10.5	9.0
Pt	44.4	10.9

After dealloying

Element	Wt.%	At.%
AI	0.2	1.0
Fe	18.8	44.3
Pt	81.0	54.7

Fig. S-1 EDS results of PtFeAl ternary alloy before and after dealloying in 0.5 M NaOH solution.



Fig. S-2 XRD pattern of the precursor ternary alloy, the sample dealloyed in 0.5 M NaOH solution and the sample dealloyed in 5 M NaOH solution.



Fig. S-3 Large-area HRTEM image of np-PtFe, inset is the corresponding selected-area electron diffraction pattern.









Fig. S-4 SEM images of PtFeAl alloy after dealloying in 0.5 M NaOH aqueous solution for 0 min (a), 15 min (b, c) and 60 min (e, f).



Fig. S-5 SEM image of the sample obtained by dealloying $Fe_{20}Al_{80}$ in 5 M NaOH solution for 24 h.



Fig. S-6 XPS spectra of Pt 4f (a) and Fe 2p (b) core levels of np-PtFe surface alloy.



Fig. S-7 SEM image of np-PtFe SA after continuous 5000 CV cycles from 0.6 to 0.9 V in 0.5 M $\rm H_2SO_4$ solution.