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Online Supporting Information for

Tailoring the Composition of Ultrathin, Ternary Alloy PtRuFe Nanowires for the Methanol

Oxidation Reaction and Formic Acid Oxidation Reaction

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Figure S1. Representative TEM images of the overall network-like nanowire structure. Specifically, data shown pertain to (A) Pt₇Ru₃ NWs, (B) Pt₇Ru_{1.5}Fe_{1.5} NWs, and (C) Pt₇Ru₂Fe NWs, respectively.



Figure S2. EDAX data for (A) Pt₇Ru₃ NWs, (B) Pt₇Ru_{2.5}Fe_{.5} NWs, (C) Pt₇Ru₂Fe NWs, D) Pt₇Ru_{1.5}Fe_{1.5} NWs, (E) Pt₇RuFe₂ NWs, (F) Pt₇Ru_{.5}Fe_{2.5} NWs, and (G) Pt₇Fe₃ NWs, respectively.

Catalyst	Pt % Comp.	Ru % Comp.	Fe % Comp.	Avg. Diameter
Pt NWs	100%			$1.9 \pm .3 \text{ nm}$
Pt7Ru3 NWs	72%	28%		$2.0 \pm .4$ nm
Pt7Ru2.5Fe.5 NWs	73%	22%	5%	$2.1 \pm .3 \text{ nm}$
Pt7Ru2Fe NWs	72%	19%	9%	$2.2 \pm .4$ nm
Pt7Ru1.5Fe1.5 NWs	69%	14%	17%	$2.1 \pm .4$ nm
Pt7RuFe2 NWs	70%	9%	21%	$2.0 \pm .2 \text{ nm}$
Pt7Ru.5Fe2.5 NWs	73%	4%	23%	$1.9 \pm .3 \text{ nm}$
Pt7Fe3 NWs	67%		33%	$2.0 \pm .2$ nm

Table S1. Atomic percent compositions for each of the metals present in each catalyst as well as the average diameters of each of the nanowires synthesized, from experimental measurements.



Figure S3. Structural and electrochemical characterization for $Pt_7Ru_{2.5}Fe_{.5}$ NWs. (A) High resolution TEM image and (B) a higher resolution TEM image with the measured *d*-spacings, and (C) corresponding SAED pattern. (D) Acquired XRD pattern. (E) Representative CV curve in an argon-saturated 0.1 M HClO₄ solution, obtained at a scan rate of 20 mV/s with the current normalized to ECSA. (F) Representative CO stripping LSV. (G) Cyclic voltammogram for the methanol oxidation reaction in an argon-saturated 0.1 M HClO₄ + 0.5 M MeOH solution, obtained at a scan rate of 20 mV/s with the current normalized to ECSA. (H) Cyclic voltammogram for the formic acid oxidation reaction in an argon-saturated 0.1 M HClO₄ + 0.5 M MeOH solution, obtained at a scan rate of 20 mV/s with the current normalized to ECSA. (H) Cyclic voltammogram for the formic acid oxidation reaction in an argon-saturated 0.1 M HClO₄ + 0.5 M MeOH solution,

System	Measured (SAED)	Measured (HRTEM)	Calculated
Pt NWs	2.26 Å	2.26 Å	2.260 Å
Pt7Ru3 NWs	2.22 Å	2.22 Å	2.068 Å
Pt7Ru2.5Fe.5 NWs	2.22 Å	2.21 Å	2.079 Å
Pt7Ru2Fe NWs	2.22 Å	2.20 Å	2.077 Å
Pt7Ru1.5Fe1.5 NWs	2.12 Å	2.19 Å	2.064 Å
Pt7RuFe2 NWs	2.25 Å	2.12 Å	2.076 Å
Pt7Ru.5Fe2.5 NWs	2.24 Å	2.07 Å	2.099 Å
Pt7Fe3 NWs	2.22 Å	2.13 Å	2.067 Å

Table S2. Measured and calculated lattice *d*-spacings from both high-resolution TEM images as well as single area electron diffraction patterns, corresponding to the (111) plane of the Pt FCC lattice.



Figure S4. Full MOR CVs for (A) Pt NWs, (B) Pt₇Ru₃ NWs, (C) Pt₇Ru_{2.5}Fe_{.5} NWs, (D) Pt₇Ru₂Fe NWs, (E) Pt₇Ru_{1.5}Fe_{1.5} NWs, (F) Pt₇RuFe₂ NWs, (G) Pt₇Ru_{.5}Fe_{2.5} NWs, and (H) Pt₇Fe₃ NWs, respectively.



Figure S5. MOR activity measured for commercial PtRu NP/C with a 1:1 molar ratio.



Figure S6. Formic acid oxidation for commercial alloy PtRu NP/C with a 1:1 ratio.