Supplementary Information

PtRu Mesoporous Nanospheres as Electrocatalysts with Enhanced Performance for Oxidation of Methanol

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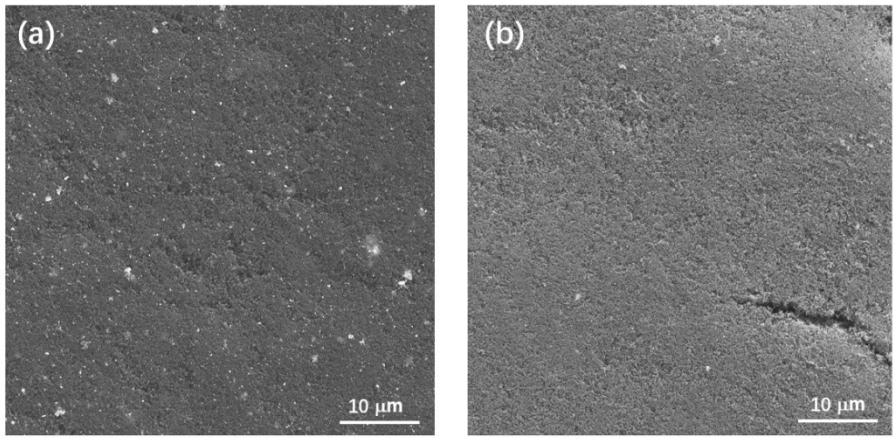

Fig. S1. SEM images of the products prepared by the addition of (a) KBr and (b) KCl.

Table S1. The formulations of different PtRu MNs.

Sample	K_2PtCl_4 (mmol)	$RuCl_3$ (mmol)	L-ascorbic acid (mmol)
PtRu (3:1) MNs	0.0225	0.0075	0.2
PtRu (2:1) MNs	0.0225	0.01125	0.2
PtRu (1:1) MNs	0.0225	0.0225	0.2
PtRu (1:2) MNs	0.0225	0.045	0.2
PtRu (1:3) MNs	0.0225	0.0675	0.2

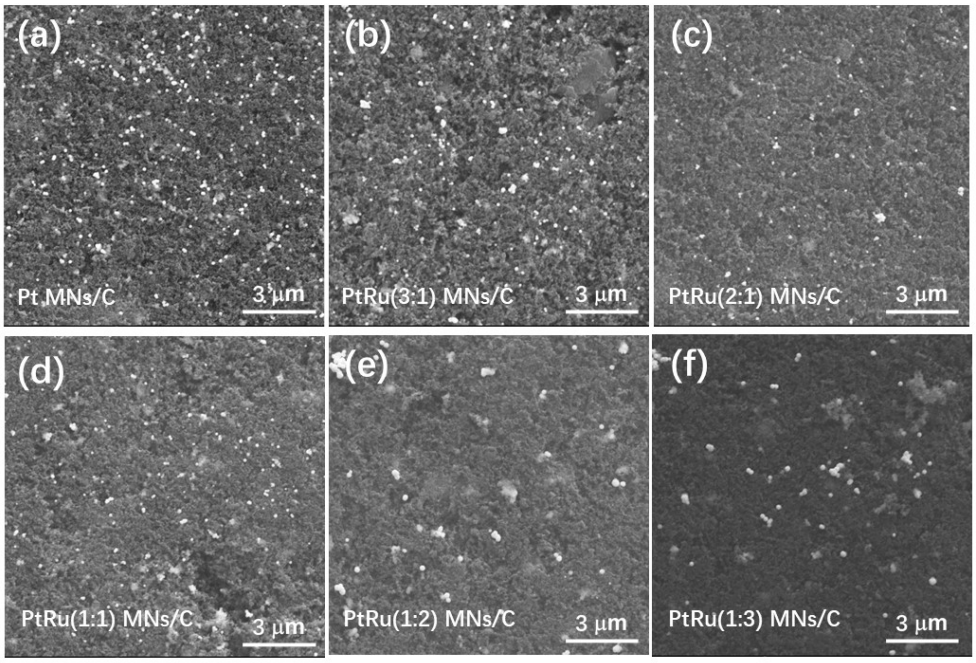

Fig. S2. SEM images of (a) Pt MNs/C and (b-f) PtRu MNs/C with different atomic ratios.

Table S2. The electrochemical characteristics of the as-prepared Pt MNs/C and PtRu MNs/C catalysts for MOR.

Sample	forward peak potential (V)	I_f (mA mg^{-1}_{Pt})	I_b (mA mg^{-1}_{Pt})	I_f/I_b ratio
Pt MNs/C	0.89	17.33	10.20	1.70
PtRu (3:1) MNs/C	0.87	25.93	16.49	1.57
PtRu (2:1) MNs/C	0.89	111.77	63.69	1.75
PtRu (1:1) MNs/C	0.86	39.05	37.73	1.03
PtRu (1:2) MNs/C	0.89	8.72	5.28	1.65
PtRu (1:3) MNs/C	0.89	7.36	4.00	1.84

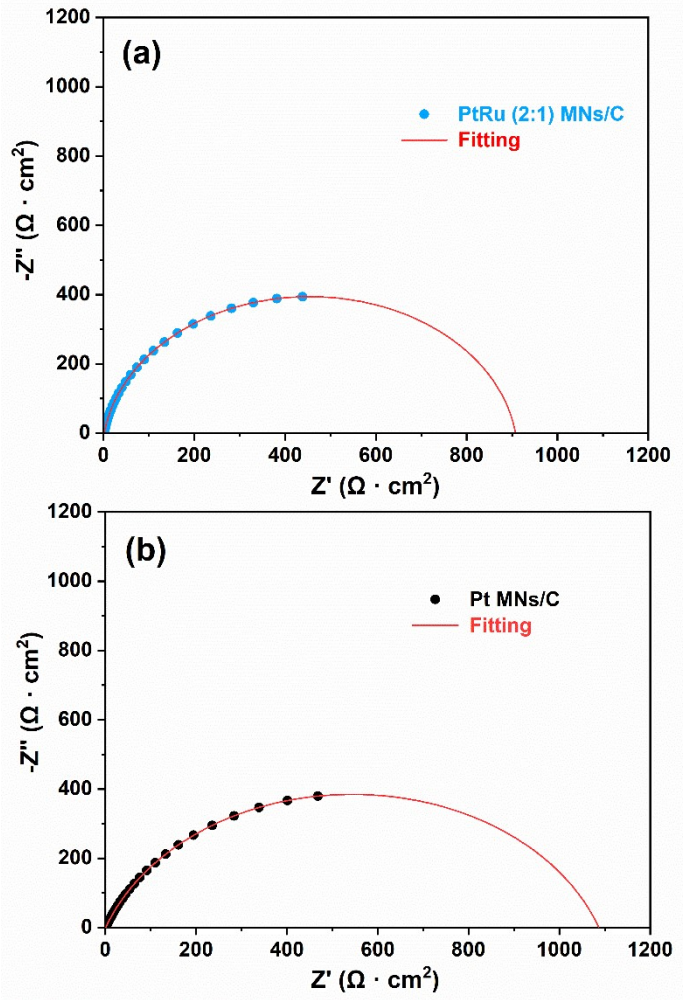

Fig. S3. Nyquist plots of EIS for (a) PtRu (2:1) MNs/C and (b) Pt MNs/C in a solution of 0.5 M CH_3OH and 0.5 M H_2SO_4.

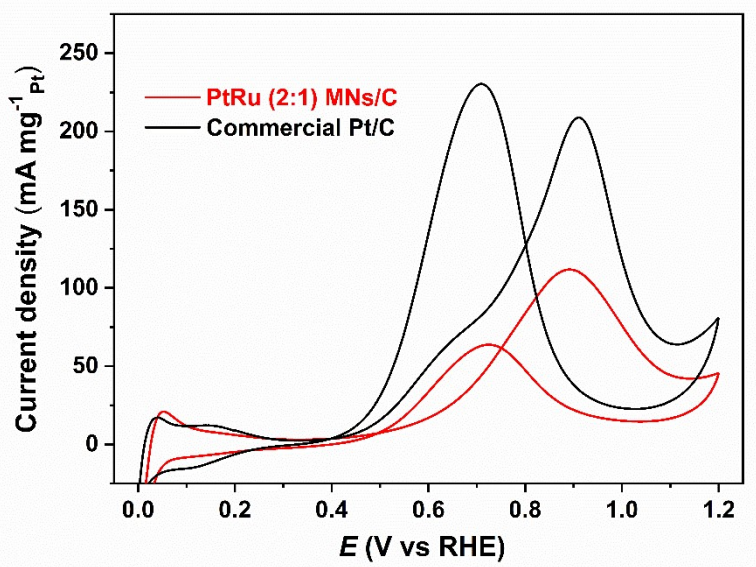

Fig. S4. Cyclic voltammetry profiles of PtRu (2:1) MNs/C and commercial Pt/C in a solution of 0.5 M H_2SO_4 and 0.5 M CH_3OH. The scan rate is 50 mV s^{-1}.

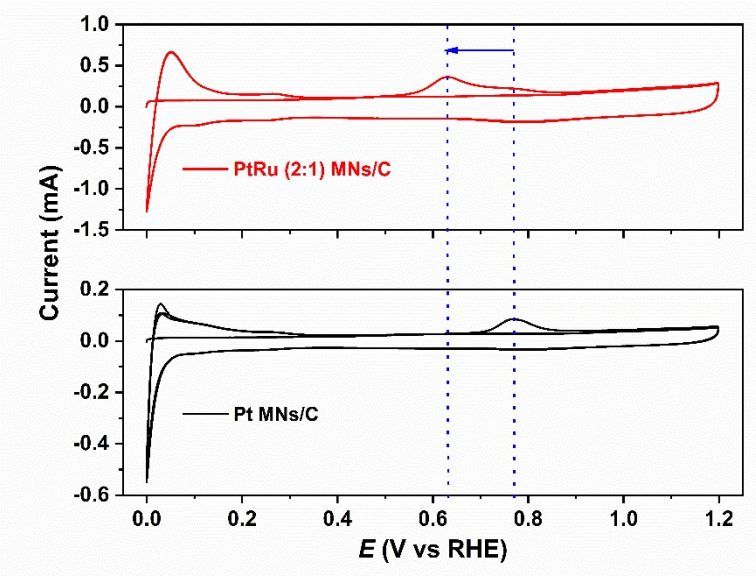

Fig. S5. CO stripping voltammograms for PtRu (2:1) MNs/C and Pt MNs/C in CO-saturated 0.5 M H_2SO_4 at a sweep rate of 20 mV s^{-1}.

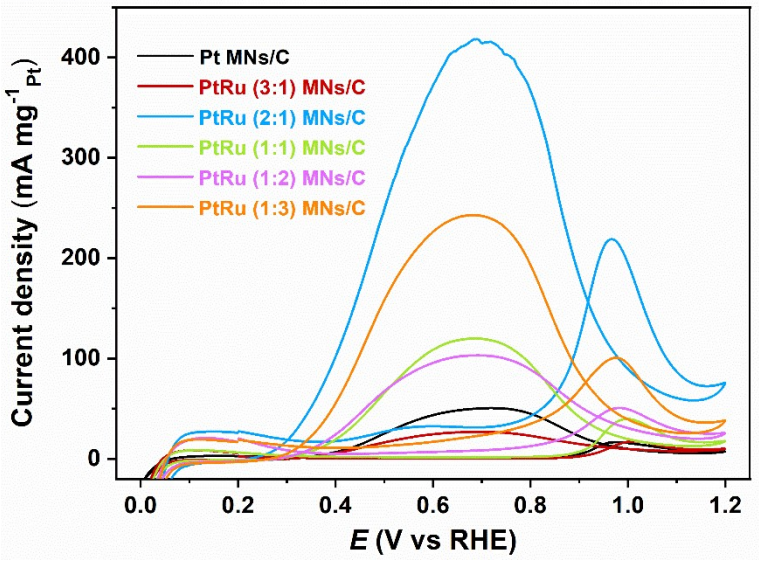

Fig. S6. Cyclic voltammetry profiles of the as-prepared PtRu MNs/C and Pt MNs/C catalysts in 0.5 M H_2SO_4 + 0.5 M HCOOH solution. The sweep rate is 50 mV s^{-1}.

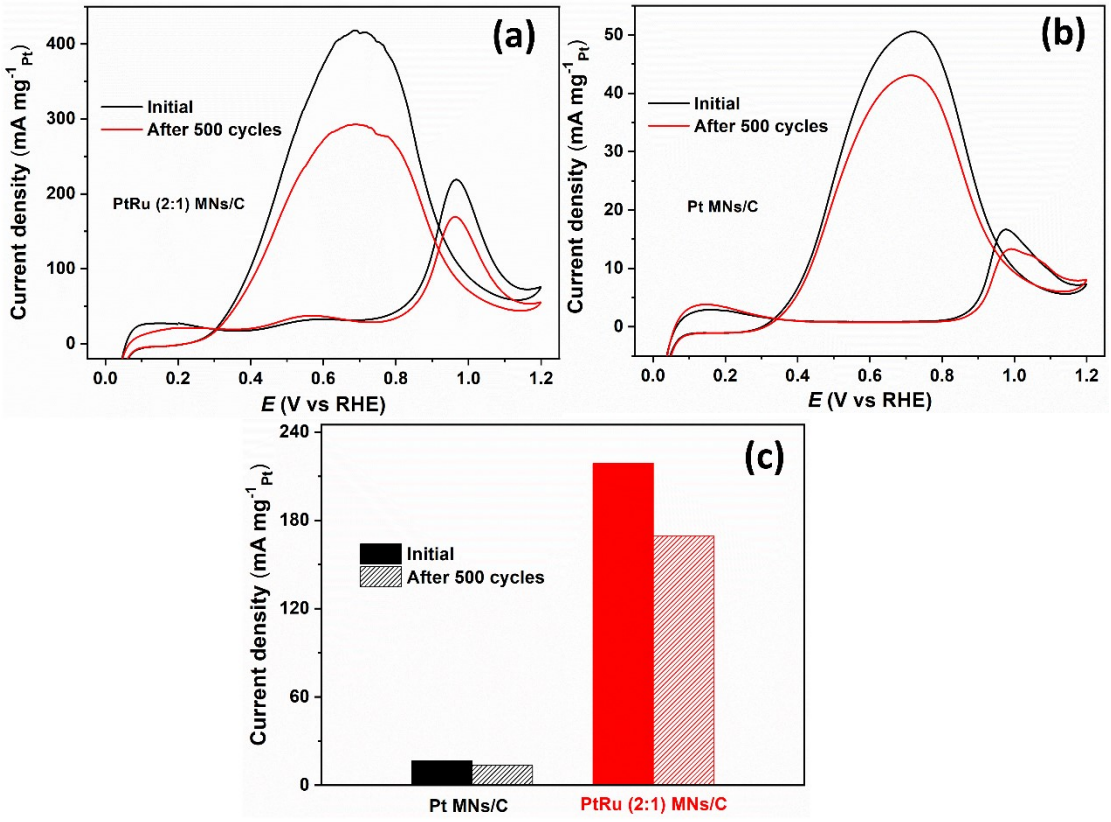

Fig. S7. CV curves of (a) PtRu (2:1) MNs/C and (b) Pt MNs/C before and after 500 potential cycles in 0.5 M H_2SO_4 + 0.5 M HCOOH solution at a scan rate of 50 mV s^{-1}. (c) Summary of the mass activity loss for different electrocatalysts.