

Electronic Supplementary Information (ESI) for

**One-step Synthesis of Polyoxometalate Encapsulating Pt Based
Electrocatalyst for Methanol Oxidation**

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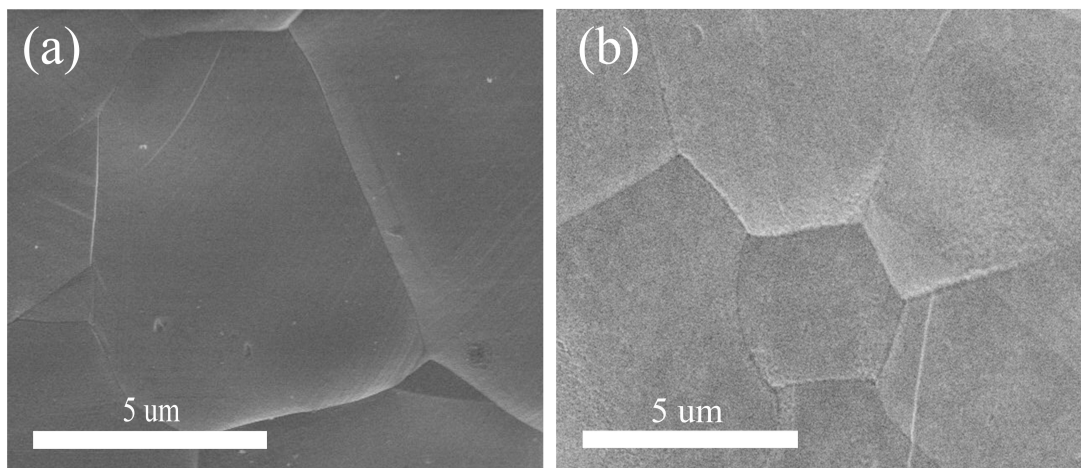


Fig. S1 SEM of the Ni foam before(a) and after(b) the reaction

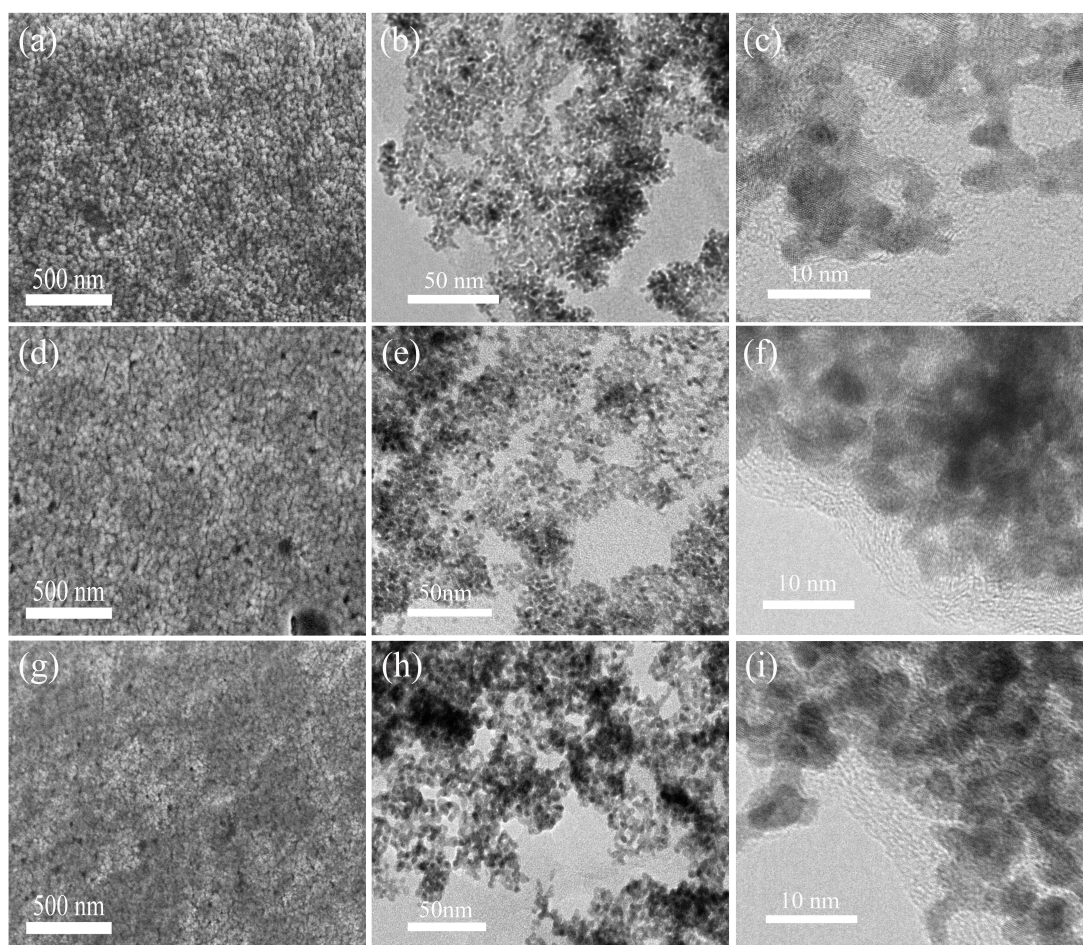


Fig. S2 SEM ,TEM and HRTEM of the PPGN-2,3,4

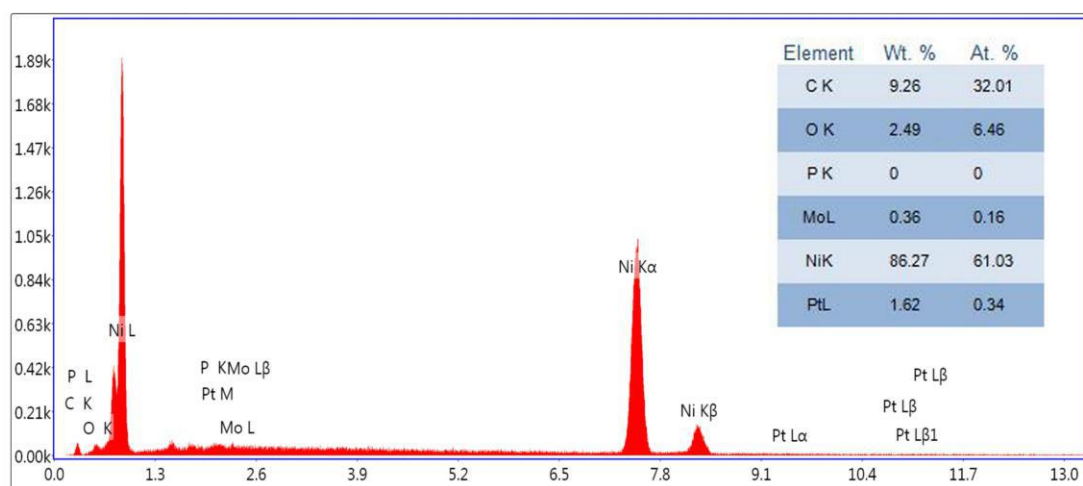


Fig. S3 EDX of the PPGN-1

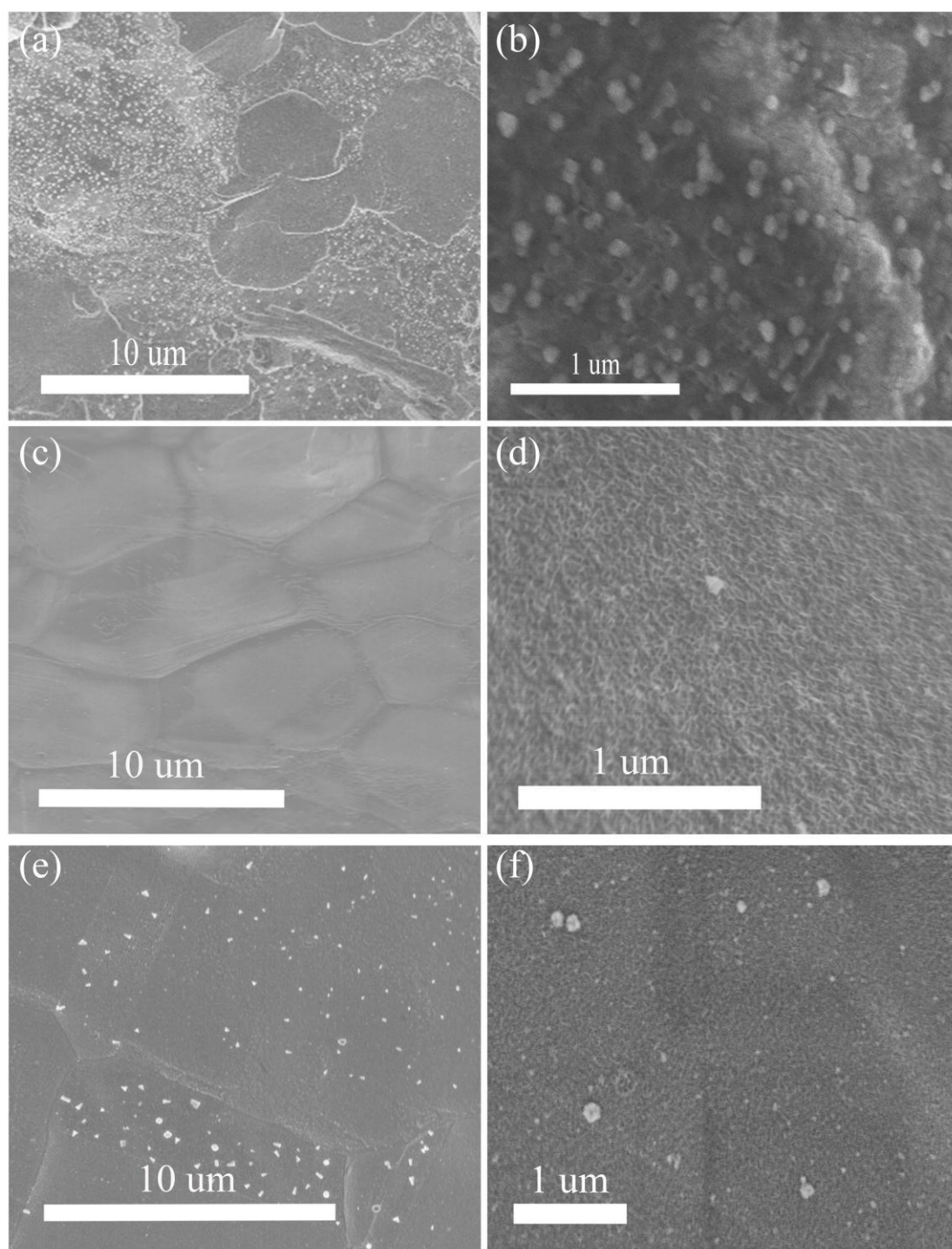


Fig. S4 SEM of the PGN(a,b) ,PPN(c,d) and PN(e,f)

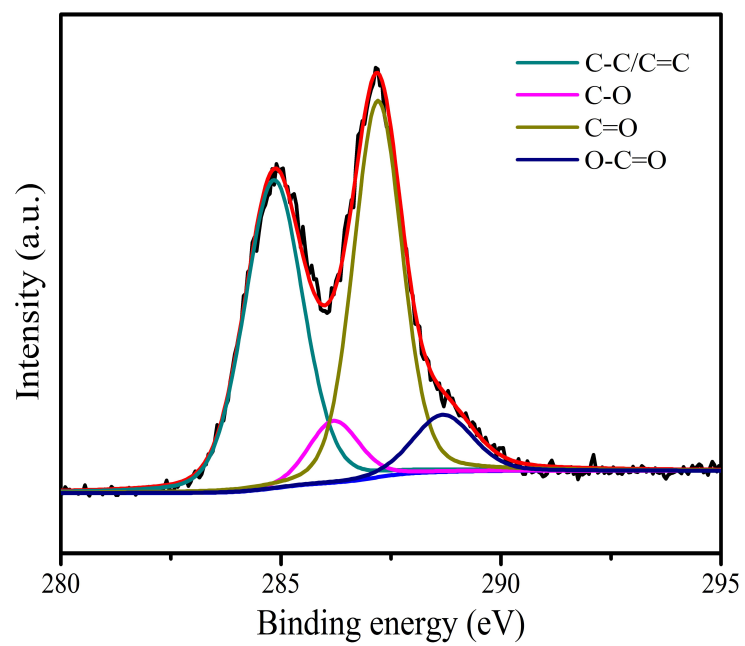


Fig. S5 XPS of graphene oxide (GO).

Table S1 C 1s peak binding energy (eV) (relative percentage %)

Samples	C-C/C=C	C-O	C=O	O-C=O
GO	284.8(42.2%)	286.2(7.3%)	287.2(42.6%)	288.7(7.9%)
PPGN-1	284.6(50.1%)	286.6(36.2%)	288.0(10.0%)	288.9(3.7%)

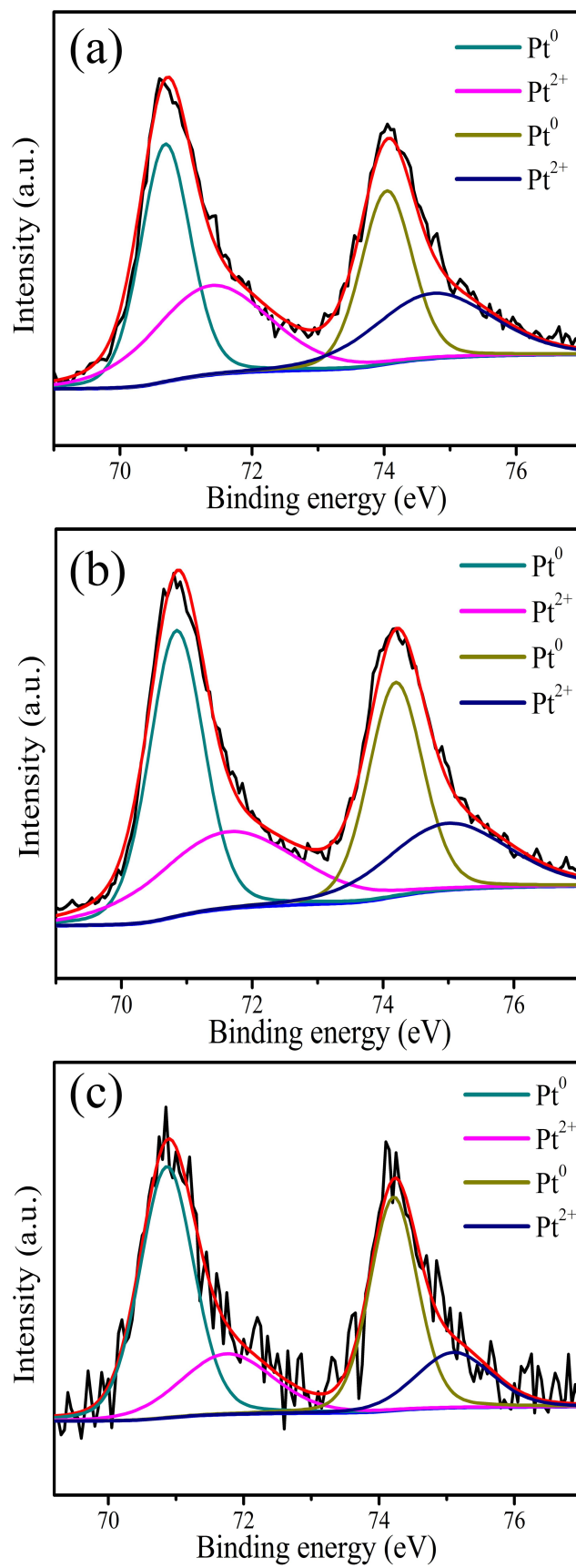


Fig. S6 The Pt 4f spectrum of the PPGN-2,3,4

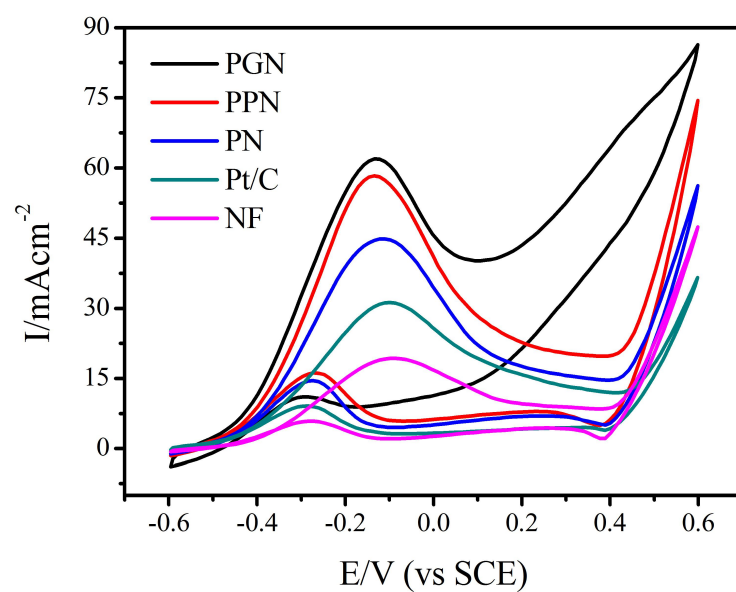


Fig. S7 CV curves of PGN, PPN, PN, commercial Pt/C and Ni foam in 1 mol/L CH₃OH +0.1 mol/L KOH solution

Table S2 Electrocatalyst properties in the literature have been reported under alkaline conditions

	Electrocatalyst	Electrolyte	Current density	Pt loading	Reference
1	Pt/G–V(C, N)	0.5 M CH ₃ OH + 1 M KOH	48 mAcm ⁻²	---	<i>Nanoscale</i> , 2015, 7, 1301-1307
2	Pt-TNTs/RGO	1.0 M CH ₃ OH + 0.5 M KOH	4.4 mAcm ⁻²	0.12% (vs. total support)	<i>ACS applied materials & interfaces</i> , 2014, 6, 17753-17761
3	PtAu SLAs	1.0 M CH ₃ OH + 0.5 M KOH	41.77 mAcm ⁻²	0.071 mg cm ⁻²	<i>Journal of Power Sources</i> , 2016, 330, 140-148
4	Pd-4-Ni	1.0 M CH ₃ OH + 1.0 M NaOH	180.8 mAcm ⁻²	0.9308 mg cm ⁻²	<i>Journal of Power Sources</i> , 2016, 306, 361-368
5	Pt-Pd HPNSs	0.5 M CH ₃ OH + 0.1M KOH	204.6 Ag ⁻¹	---	<i>Journal of Power Sources</i> , 2016, 302, 195-201
6	Porous Co/Co–Ni–Pt	0.1 M CH ₃ OH + 1 M NaOH	39 mAcm ⁻²	---	<i>Journal of Porous Materials</i> , 2017, 24, 305-313
7	Fe/Pt–Fe	0.1 M CH ₃ OH + 1 M NaOH	14.97 mAcm ⁻²	---	<i>Chinese Journal of Catalysis</i> , 2015, 36, 1029-1034
8	G-mC-Pd/SnO ₂	2 M CH ₃ OH + 1 M NaOH	~7.81 mAcm ⁻²	---	<i>J. Mater. Chem. A</i> , 2016, 4, 8898-8904
9	Pd/N-C-400	0.5 M CH ₃ OH + 0.5 M KOH	24.92 mAcm ⁻²	---	<i>Chemistry-an Asian journal</i> , 2016, 11, 1588-1596
10	PPGN-1	1 M CH ₃ OH + 0.1M KOH	101.4 mAcm ⁻²		This work