Supplementary Information

Platinum and Other Metals Doped-Manganese Tungstate as a Novel Catalytic Support for $NaBH_4$ Hydrolysis and Hydrogen Evolution Under Mild Conditions

Jorge Luiz dos Santos,[a] Iterlandes Machado Junior,[a] Gabriel Henrique Sperandio,[a] Gessica do C. Dias,[a] Anderson Dias,[b] Geraldo M. de Lima[b] and Renata P. L. Moreira *,[a]

[a]*Departamento de Química, Universidade Federal de Viçosa (UFV), Av. Peter Henry Rolfs, s/n, 36570-000 Viçosa-MG, Brazil*

[b]*Departamento de Química, Universidade Federal de Minas Gerais, Av. Presidente Antônio Carlos, 6627, 31270-901 Belo Horizonte-MG, Brazil*

*e-mail: renata.plopes@ufv.br

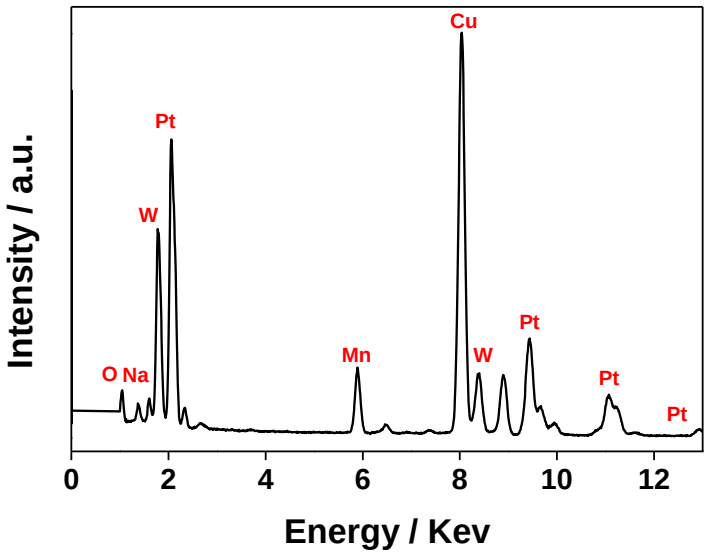


Figure S1. Energy dispersive X-ray spectroscopy (EDS) of Pt NPs/$MnWO_4$.

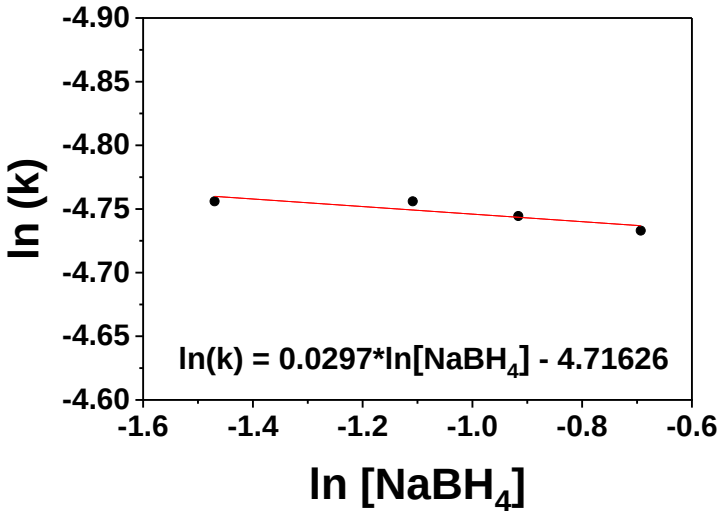


Figure S2. ln k *vs.* ln [$NaBH_4$]. Experimental conditions: 50 mg of support, dose of 0.025 mmol Pt (0.0049 g), 1.0 mL $NaBH_4$ (0.230, 0.330, 0.400 and 0.500 mol L^{-1}), constant agitation, and temperature of 293.15 K.

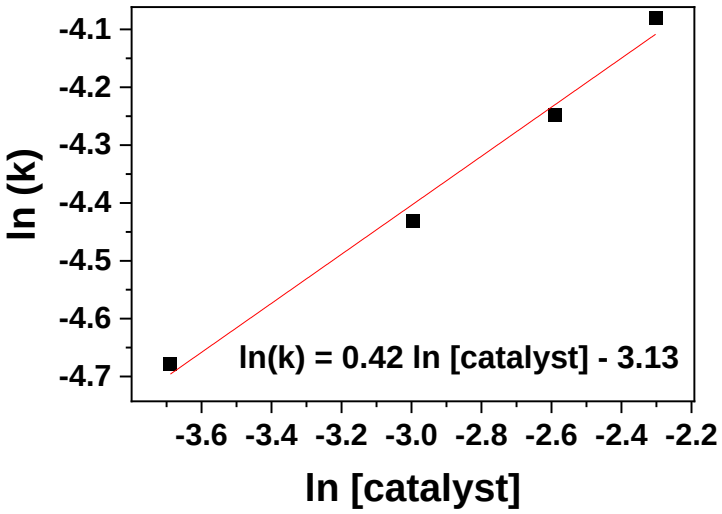


Figure S3. ln k *vs*. ln of the catalyst dose of Pt NPs/$MnWO_4$. Experimental conditions: 50 mg of support, dose of Pt (0.025, 0.050, 0.075, 0.100 mmol), 1.0 mL $NaBH_4$ (0.500 mol L^{-1}), constant agitation, and temperature of 293.15 K.

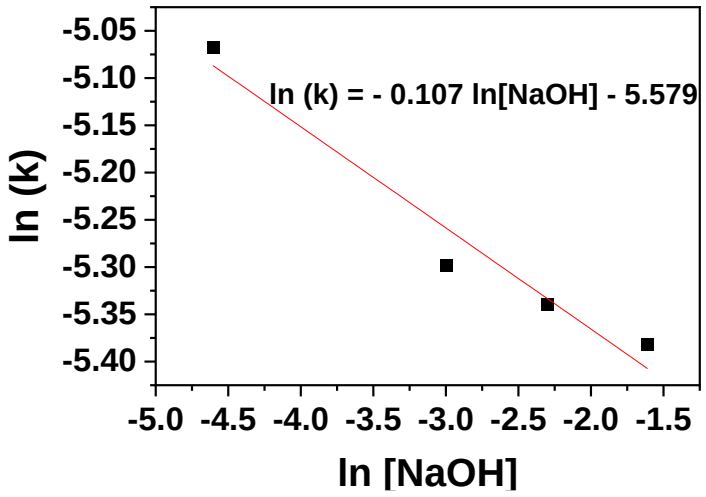


Figure S4. ln k *vs*. ln [NaOH]. Experimental conditions: 50 mg of support, dose of 0.025 mmol Pt (0.0049g), 1.0 mL $NaBH_4$ (0.500 mol L^{-1}), constant agitation, and temperature of 293.15 K.

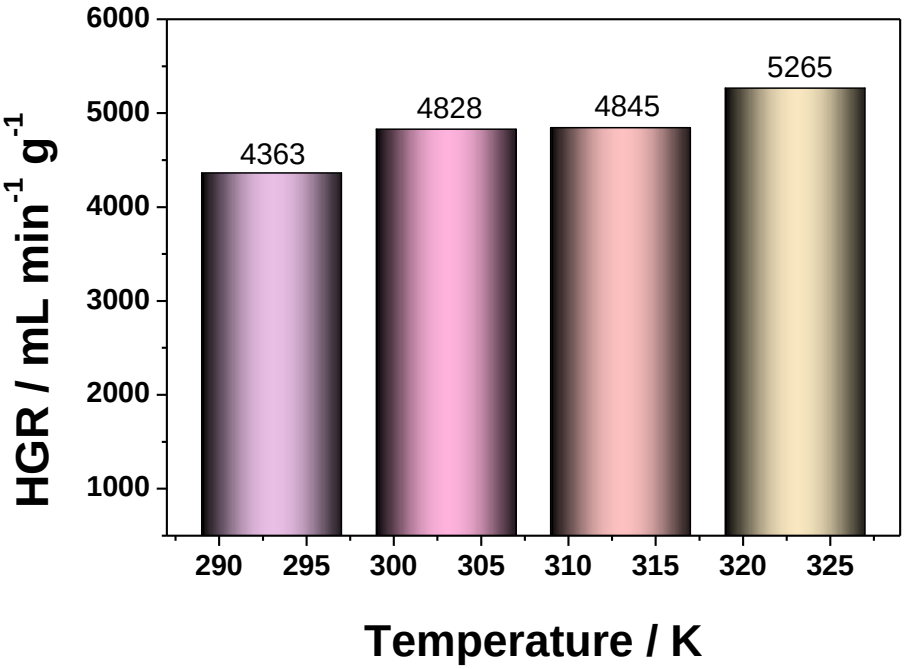
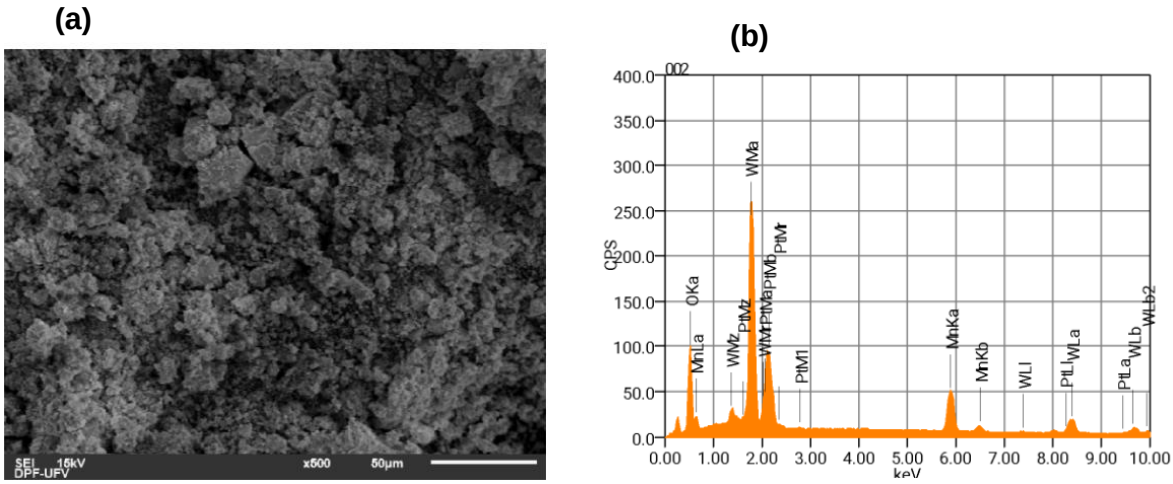


Figure S5. Hydrogen generation rate (HGR) of Pt NPs/$MnWO_4$. Experimental conditions: 50 mg of support, dose of 0.025 mmol Pt (0.0049g), 1.0 mL $NaBH_4$ (0.500 mol L^{-1}), constant agitation.



Chemical formula	mass%	Atom%	Sigma	Net	K ratio	Line
O	14.32	53.81	0.03	110626	0.1709273	K
Mn	23.79	26.04	0.10	142423	0.6110829	K
W	57.51	18.81	0.21	579304	1.0358347	M
Pt*	4.38	1.35	0.17	31744	0.0538606	M
Total	100.00	100.00				

Figure S6. (a) Scanning electron microscopy (SEM), (b) energy-dispersive X-ray spectroscopy (EDS), and (c) composition analysis of Pt NPs/$MnWO_4$ after multiple use cycles.