Electronic Supplementary Material (ESI) for Environmental Science: Nano.
This journal is © The Royal Society of Chemistry 2020

Electronic Supplementary Information (ESI)

Functionalized Fe/Ni@g-C_3N_4 nanostructures for the enhanced trichloroethylene dechlorination and successive oxygen reduction reaction activity

Rama Shanker Sahu[a,b] and Ruey-an Doong[a, c*]

[a]Department of Biomedical Engineering and Environmental Sciences, National Tsing Hua University, Hsinchu, 30013, Taiwan.

[b]Department of Agricultural Chemistry, National Taiwan University, No. 1, Sec. 4, Roosevelt Road, Taipei 106, Taiwan.

[c]Institute of Analytical and Environmental Sciences, National Tsing Hua University, Hsinchu, 30013, Taiwan.

*Corresponding author (Ruey-An Doong):

E-mail address: radoong@mx.nthu.edu.tw; Tel: +886-3-5726785. Fax: +886-3-5718649.

Table S1. The atomic and elemental ratios of Fe and Ni species in Fe/Ni@g-C_3N_4 nanocomposites obtained from XPS spectra.

Nanocomposites		**Chemical States**						**Elemental ratio**
		C	N	Fe^0	Fe^{2+}	Ni^0	Ni^{2+}	
g-C_3N_4	BE	284.6	399.07	706.9	708.9	852.7	853.9	(C:N) (54.5:45.5)
	AR	54.5	45.5	-	-	-	-	
Fe/Ni@g-C_3N_4	AR	100	100	69.33	30.67	68.3	31.8	(C:N:Fe:Ni) 72.2:4.2:21.6:1.8
	RSF	0.314	0.499	2.946		2.309		

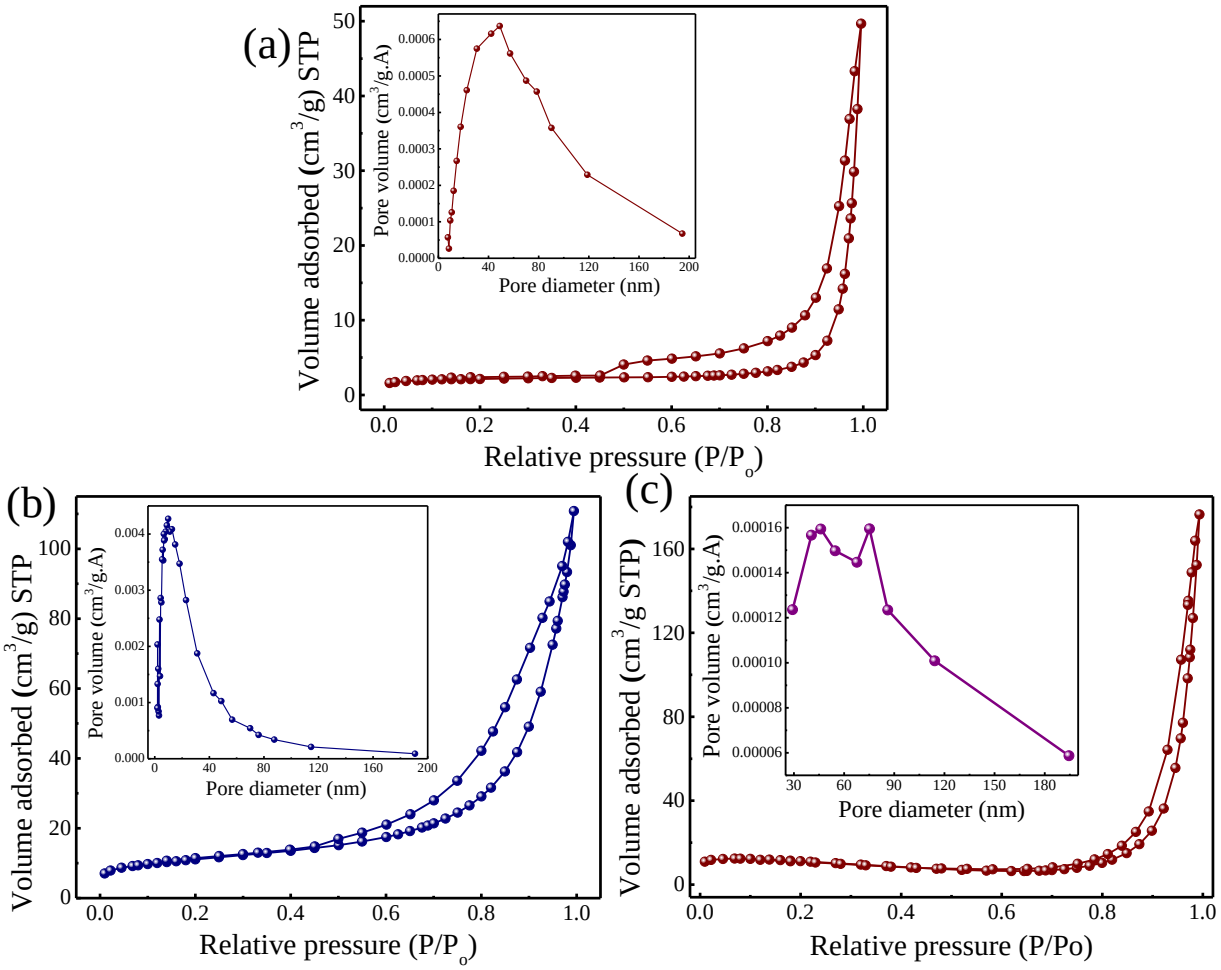
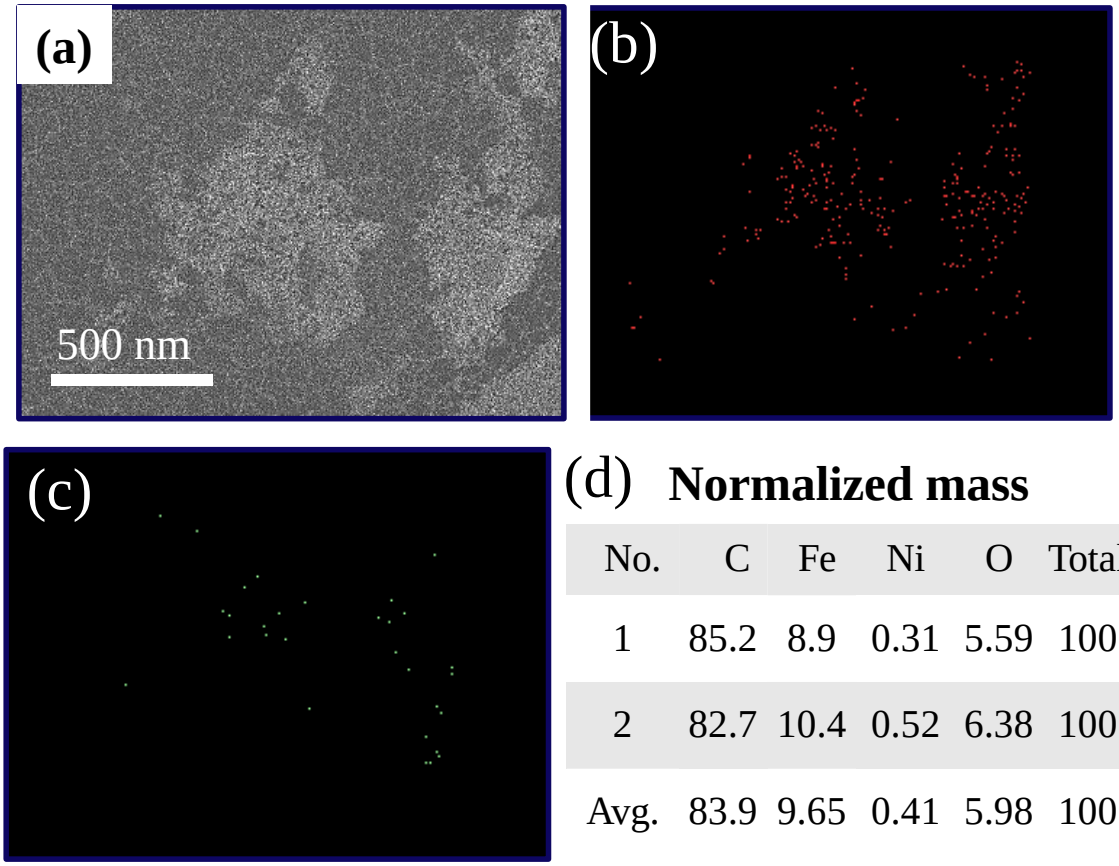


Fig. S1. N_2 adsorption-desorption isotherms and pore size distribution of (a) bulk g-C_3N_4 (b) layered g-C_3N_4, and (c) Fe/Ni@g-C_3N_4 nanocomposite.



(d) **Normalized mass**

No.	C	Fe	Ni	O	Total
1	85.2	8.9	0.31	5.59	100
2	82.7	10.4	0.52	6.38	100
Avg.	83.9	9.65	0.41	5.98	100

Fig. S2. (a) SEM image of Fe/Ni@g-C_3N_4, elemental mapping of (b) Fe and (c)Ni elements, and (d) normalized mass of C, O, Fe, and Ni.

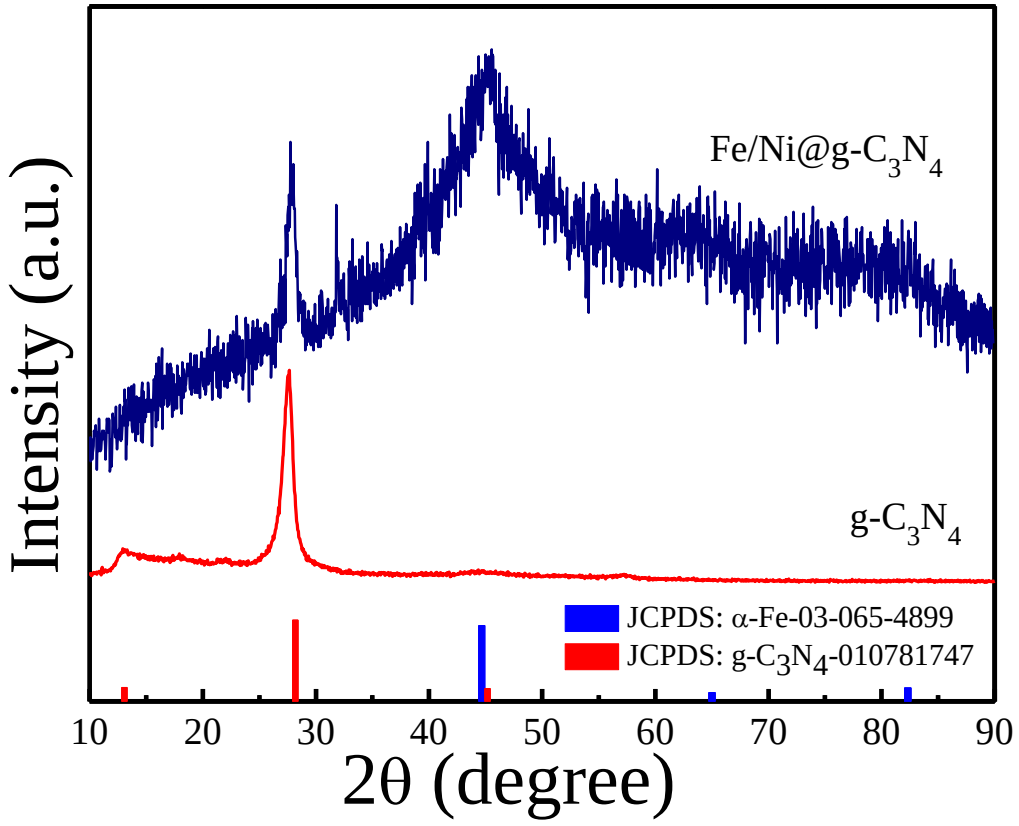


Fig. S3. XRD patterns of as-prepared g-C_3N_4 and Fe/Ni@g-C_3N_4 nanocomposite.

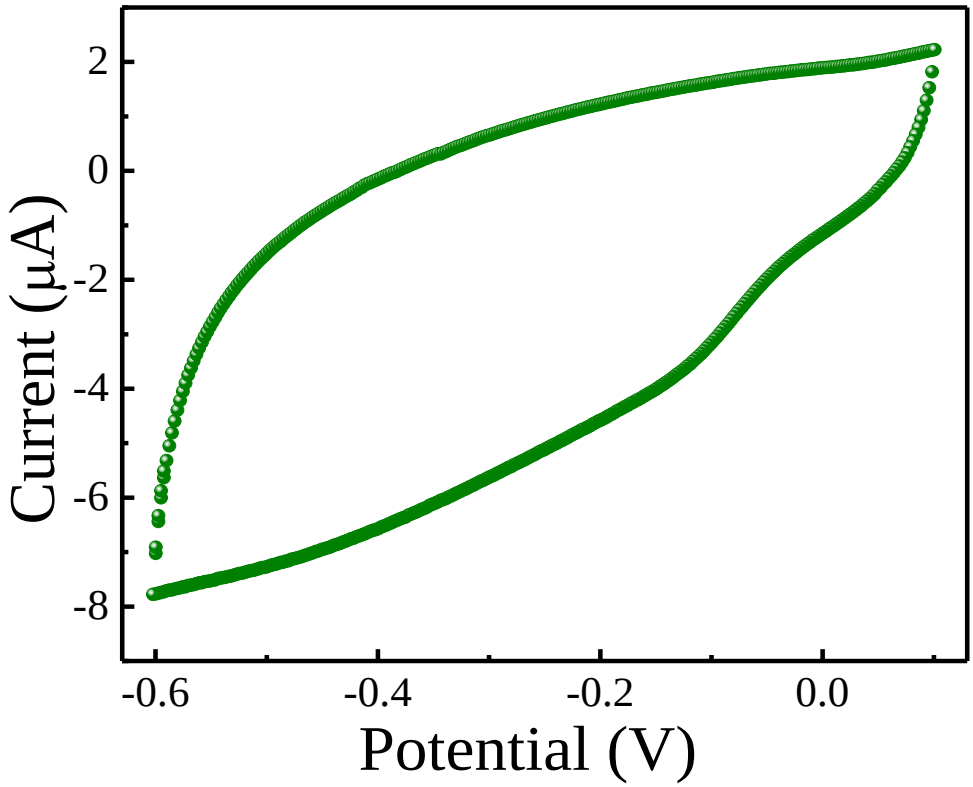


Fig S4. Cyclic voltammogram of g-C_3N_4 at a san rate of 5 mV s^{-1} in the potential window of -0.6 – 0.0 V in the presence of 0.1 M Na_2SO_4 as the electrolyte.

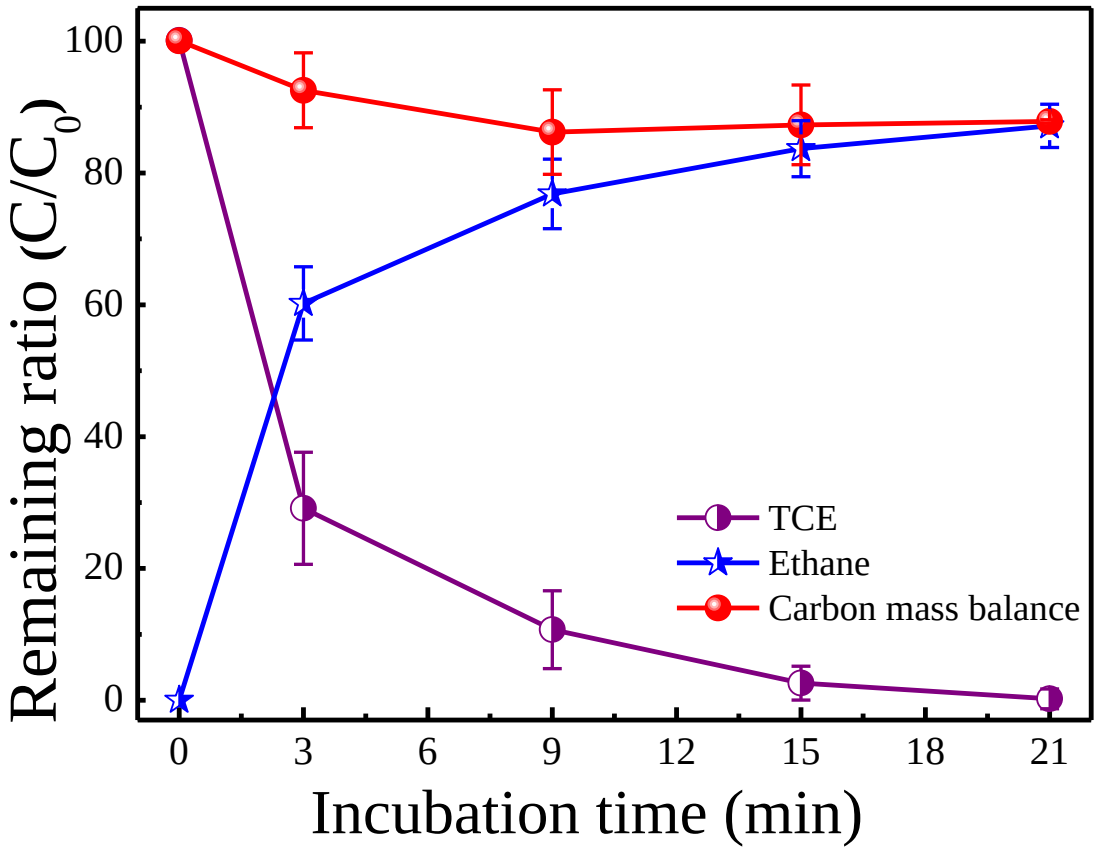


Fig. S5. Carbon mass balance and production of ethane during the dechlorination of TCE by Fe/Ni@g-C_3N_4 nanocomposites.

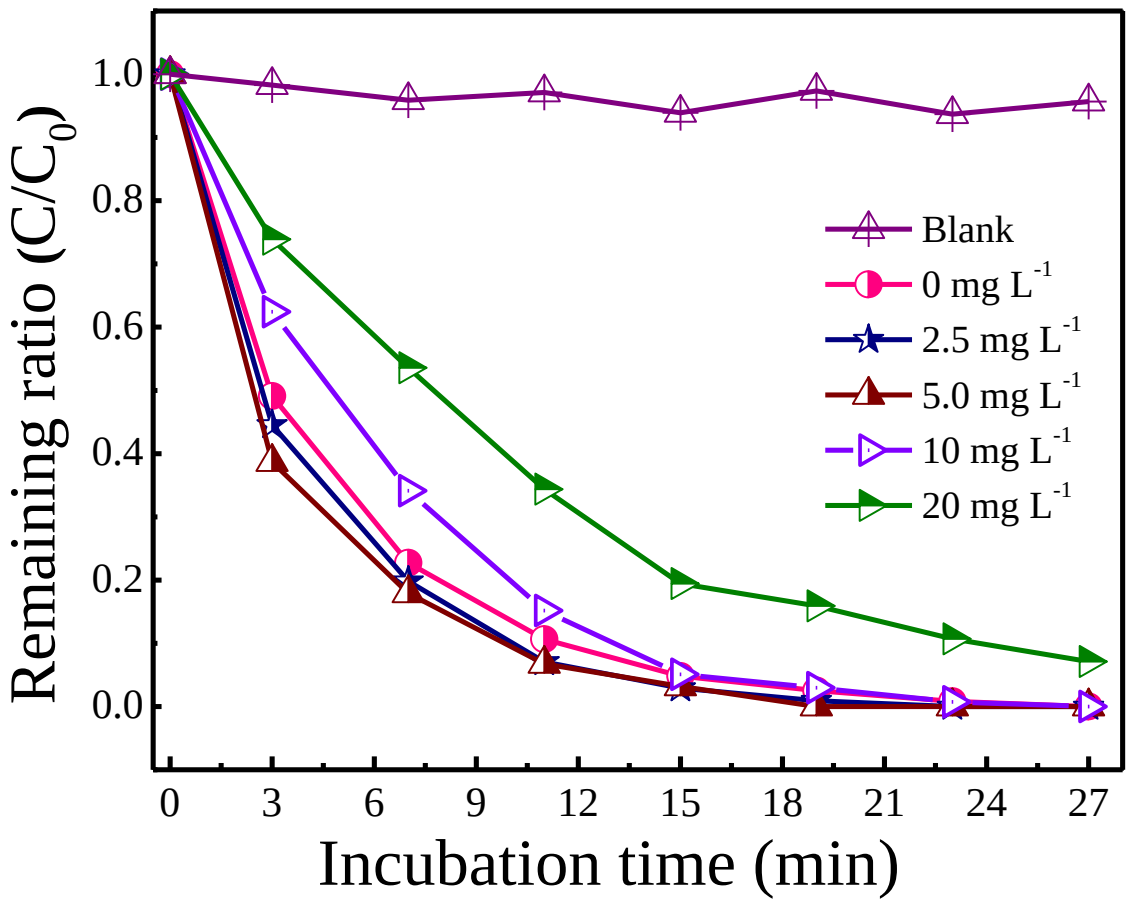


Fig. S6. Effect of humic acid concentration on TCE dechlorination by Fe/Ni@g-C_3N_4.

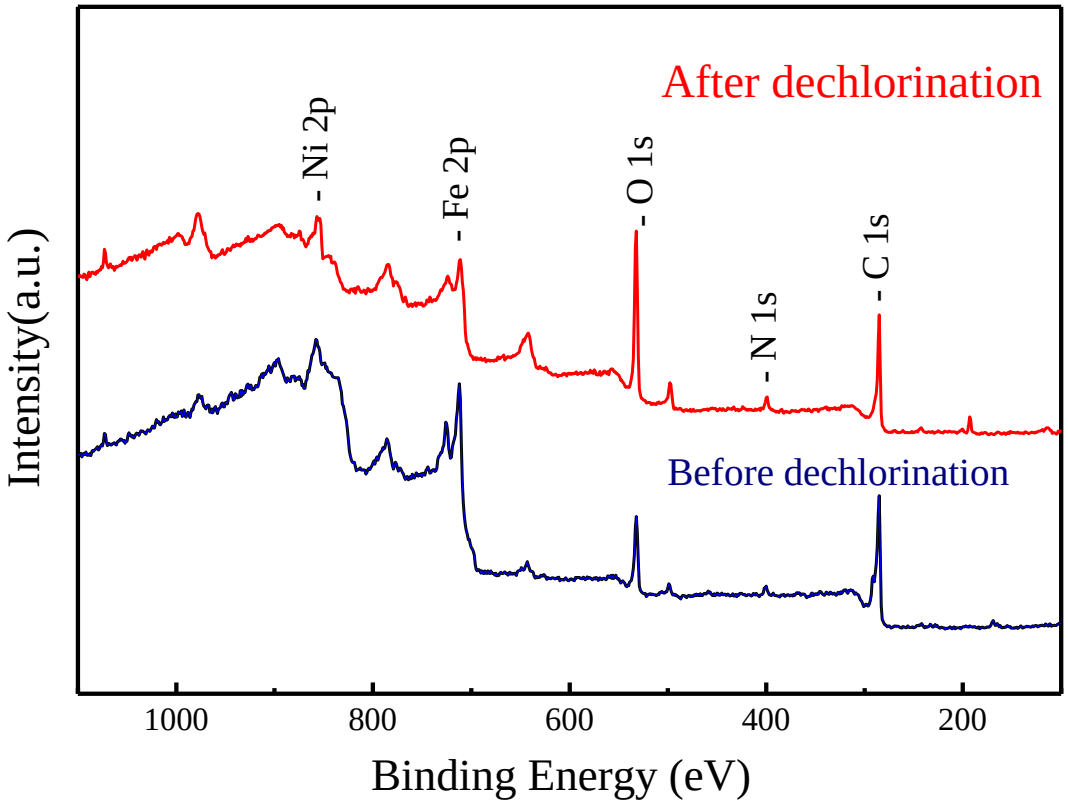


Fig. S7. Survey XPS spectra of Fe/Ni@g-C_3N_4 nanocomposite before and after TCE dechlorination.

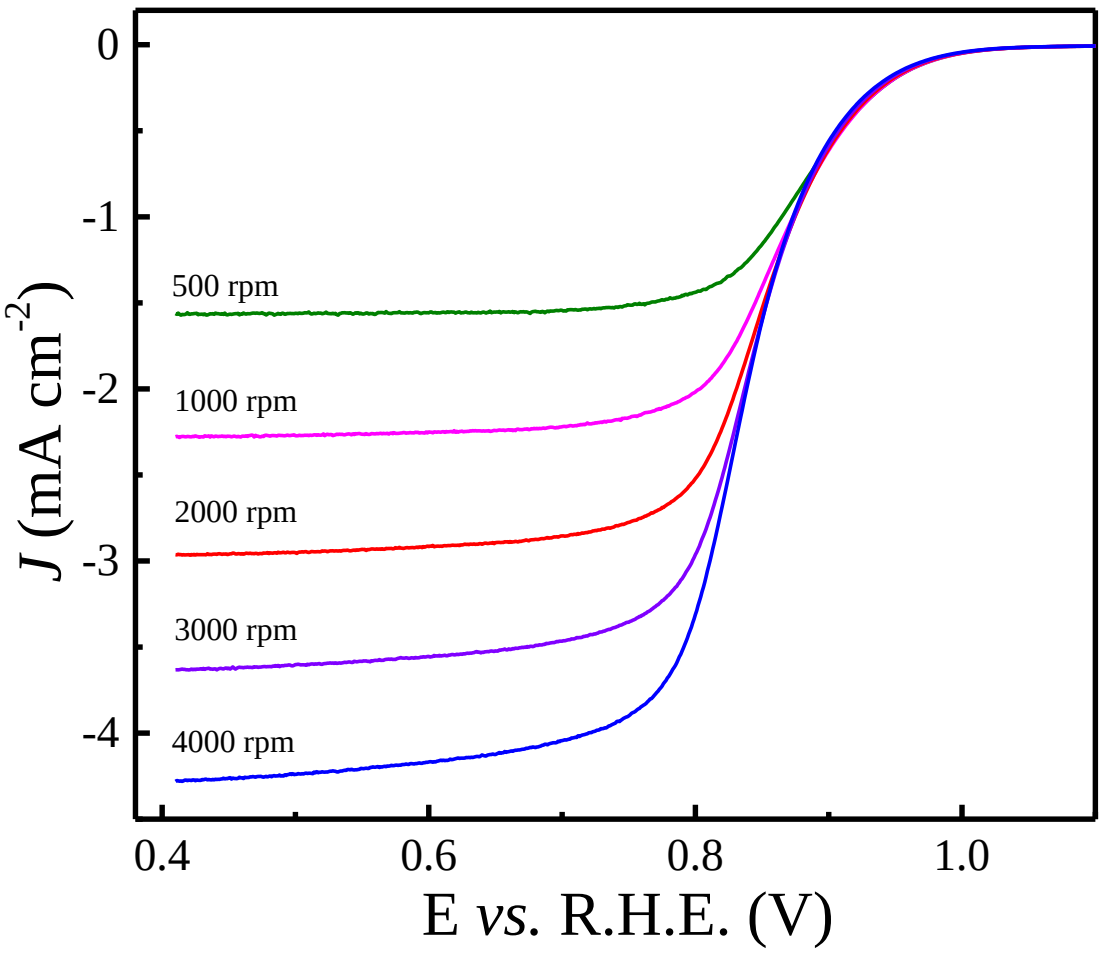


Fig. S8. LSV curves for 20% Pt/C electrode material in the rotation speed range of 500 – 4000 rpm at a san rate of 5 mV s^{-1}.