

Supplementary Information

Pyrolysis-free ZIF-67-Graphene oxide composite films for improving the sluggish kinetics of oxygen reduction reaction in neutral medium

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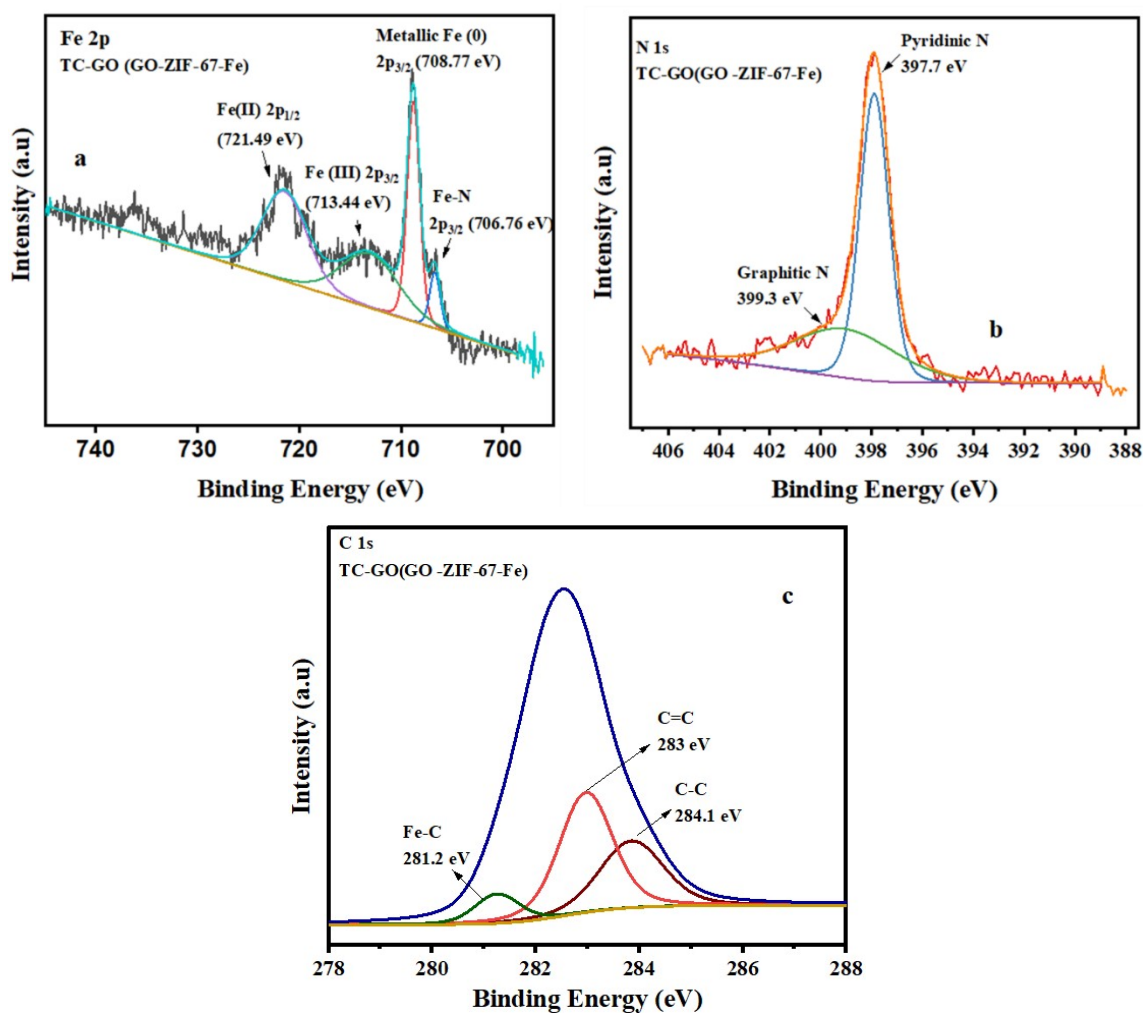


Figure S1: XPS spectra of (a) Fe 2p, (b) N 1s (c) C 1s of TC-GO (GO-ZIF-67-Fe) synthesized using boric acid.

Table S1: Anodic and cathodic peak current values and its ratio on the scan rate variation of different modifications of ZIF-67

Modified ZIF-67	Scan rate (mV/s)	ΔE_p (mV)	I_{pC} (mA)	I_{pA} (mA)	$\frac{I_{pA}}{I_{pC}}$
Graphene Oxide (GO)	5	49.2	-0.181638	0.128657	0.7072
	10	61.6	-0.282468	0.283547	1.0035
	20	99.5	-0.591434	0.539546	0.9120
	50	79.1	-0.569460	0.431246	0.7574
	100	95.7	-0.867547	0.539657	0.6217
TC-ZIF-67	1	74.6	-0.0265814	0.0117279	0.4412
	2	77.8	-0.0321012	0.0210754	0.65653
	3	84.7	-0.0411976	0.031321	0.76026
	4	98.4	-0.0524359	0.0426833	0.81400
	5	106.2	-0.0700867	0.0549088	0.78344
TC-GO (GO-ZIF-67)	1	143.4	-0.158818	0.17587	1.10737
	2	147.9	-0.191954	0.21675	1.12918
	3	156.0	-0.22883	0.32732	1.43041
	4	163.8	-0.268958	0.32324	1.20182
	5	170.0	-0.267988	0.33752	1.25946
TC-GO (GO-ZIF-67-Fe)	1	98.4	-0.155579	0.082434	0.52985
	2	97.3	-0.231736	0.157683	0.68044
	3	107.3	-0.294421	0.239478	0.81338
	4	119.8	-0.340449	0.305923	0.89859
	5	133.5	-0.402088	0.30312	0.75386

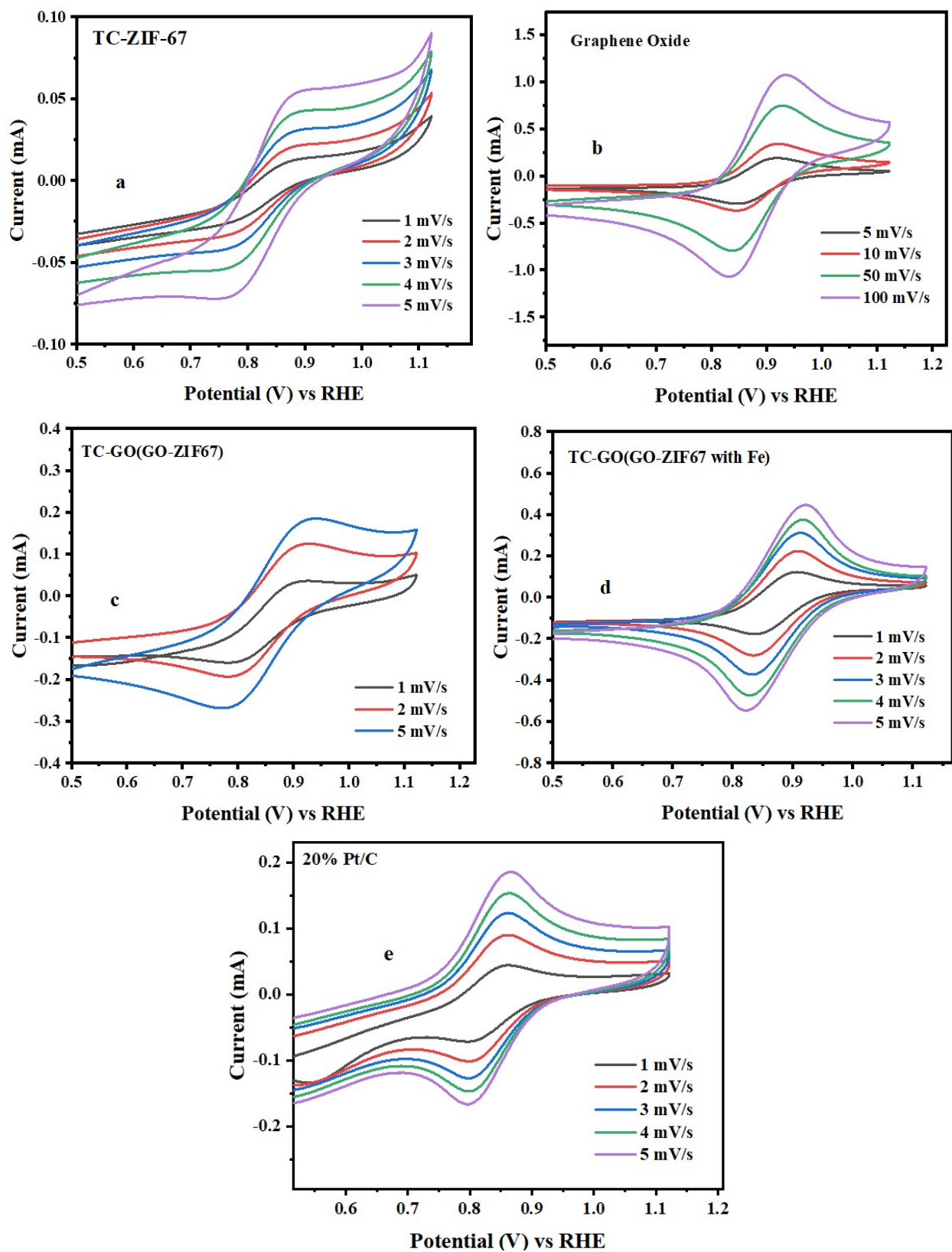


Figure S2: Cyclic voltammograms of (a) TC-ZIF-67, (b) Graphene Oxide (GO), (c) TC-GO (GO-ZIF-67), and (d) Boric acid – TC-GO (GO-ZIF-67-Fe) (e) 20 % Pt/C in 5 mM $K_3[Fe(CN)_6]$ in 1 M KCl at different scan rates.

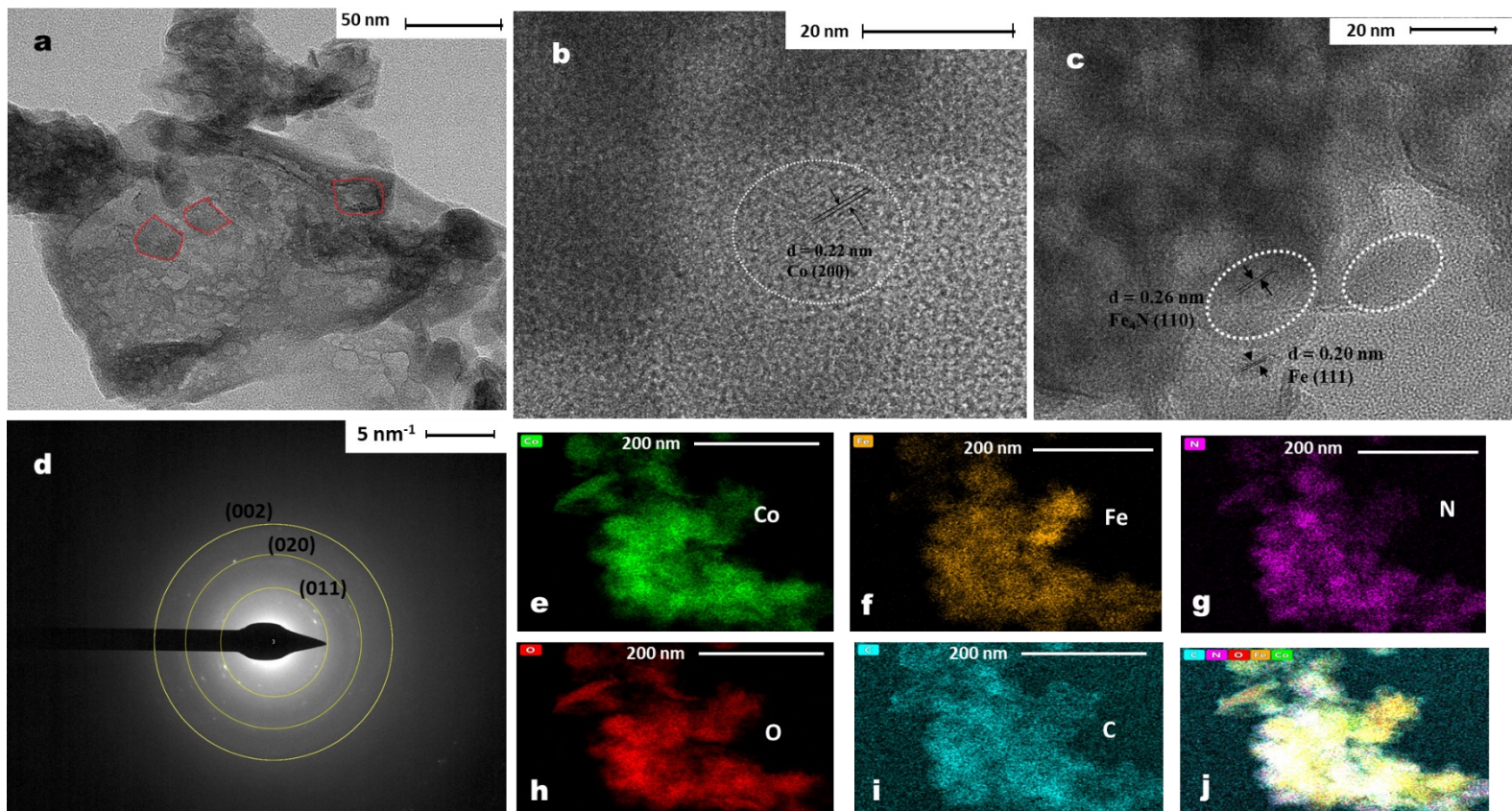


Figure S3: (a-c) HR-TEM images of TC-GO (GO-ZIF-67-Fe) (d) SAED pattern and (e-j) elemental mapping images of TC-GO (GO-ZIF-67-Fe) containing Co, Fe, N, O, C and all elements combined.