

Supporting Information

Highly efficient and self-supported 3D carbon nanotube composite electrode for enhanced oxygen reduction reaction

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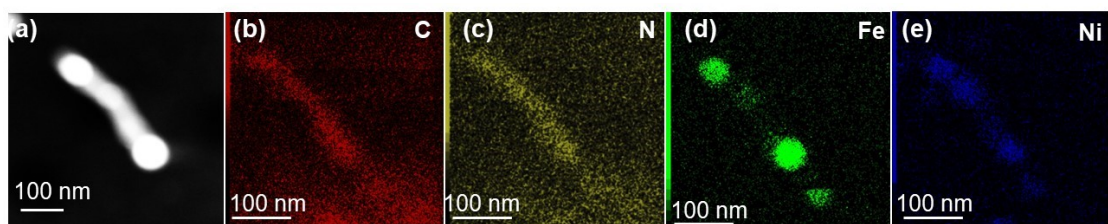


Fig. S1 High angle annular dark field scanning transmission electron microscopy (HAADF-STEM) image and the corresponding EDS mapping of C, N, Fe and Ni element of the FMPN-700.

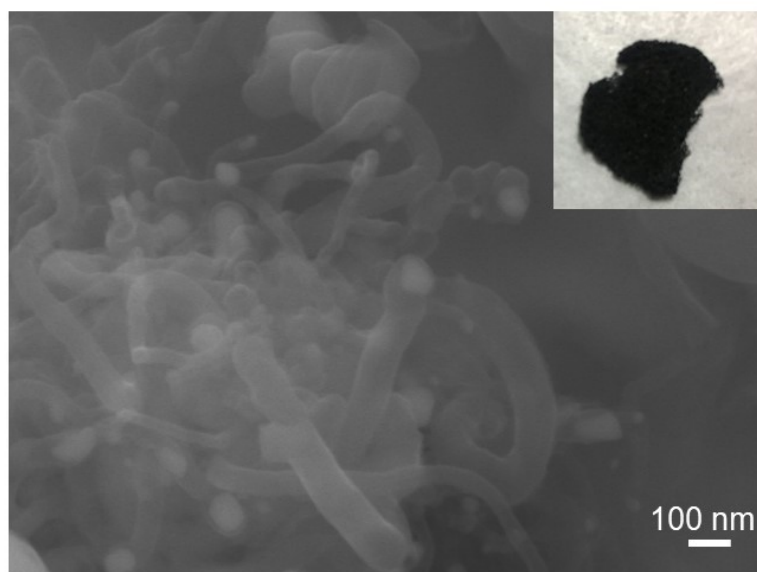


Fig. S2 SEM image of GMPN-800. The inset showed its brittleness.

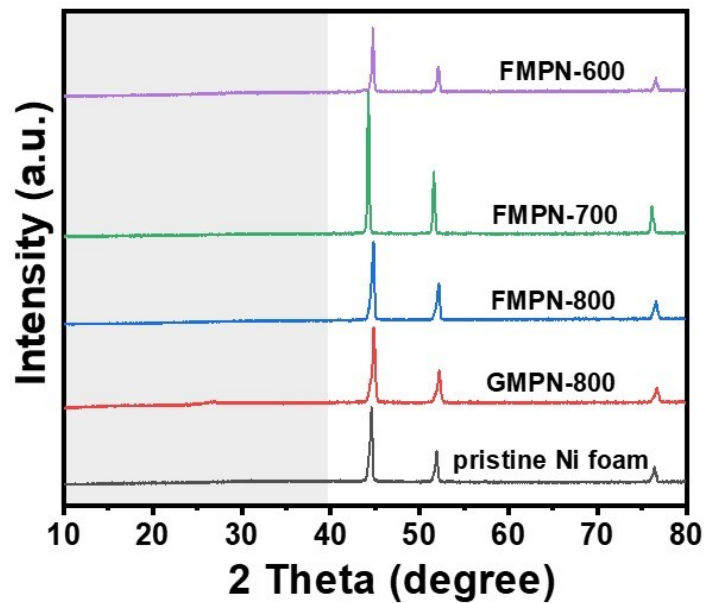


Fig. S3 XRD patterns of the pristine Ni foam, GMPN-800, FMPN-800, FMPN-700 and FMPN-600 samples.

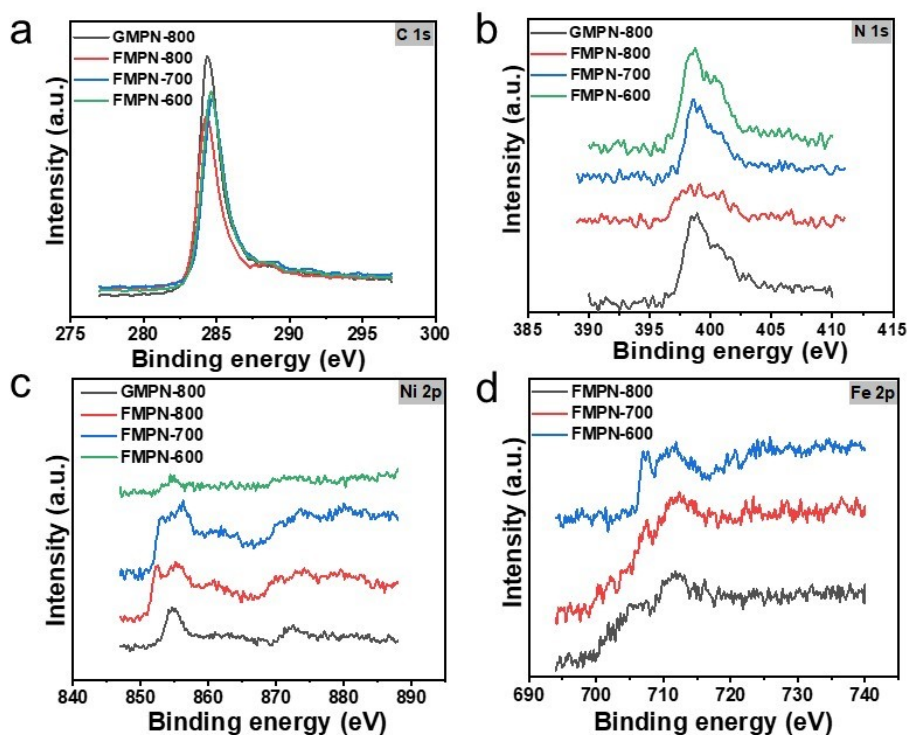


Fig. S4 High -resolution C1s, N1s, Ni 2p and Fe 2p spectra of GMPN-800, FMPN-800, FMPN-700 and FMPN-600 samples.

Table S1. Elemental composition of C, N, O, Ni and Fe in the as-prepared samples.

Sample	C (at%)	N(at%)	O(at%)	Ni(at%)	Fe(at%)
GMPN-800-acid	88.49	4.39	5.81	1.31	
FMPN-800	78.67	3.90	12.25	3.21	1.97
FMPN-700	80.78	4.12	10.33	2.64	2.14
FMPN-600	84.00	6.12	7.90	0.60	1.37

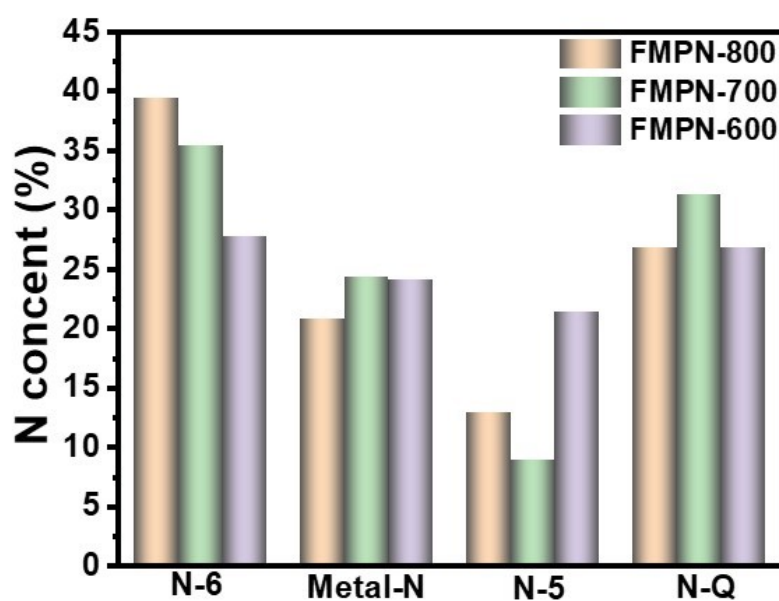


Fig. S5 Comparison of the N bonding configurations of FMPN-800, FMPN-700 and FMPN-600 samples.

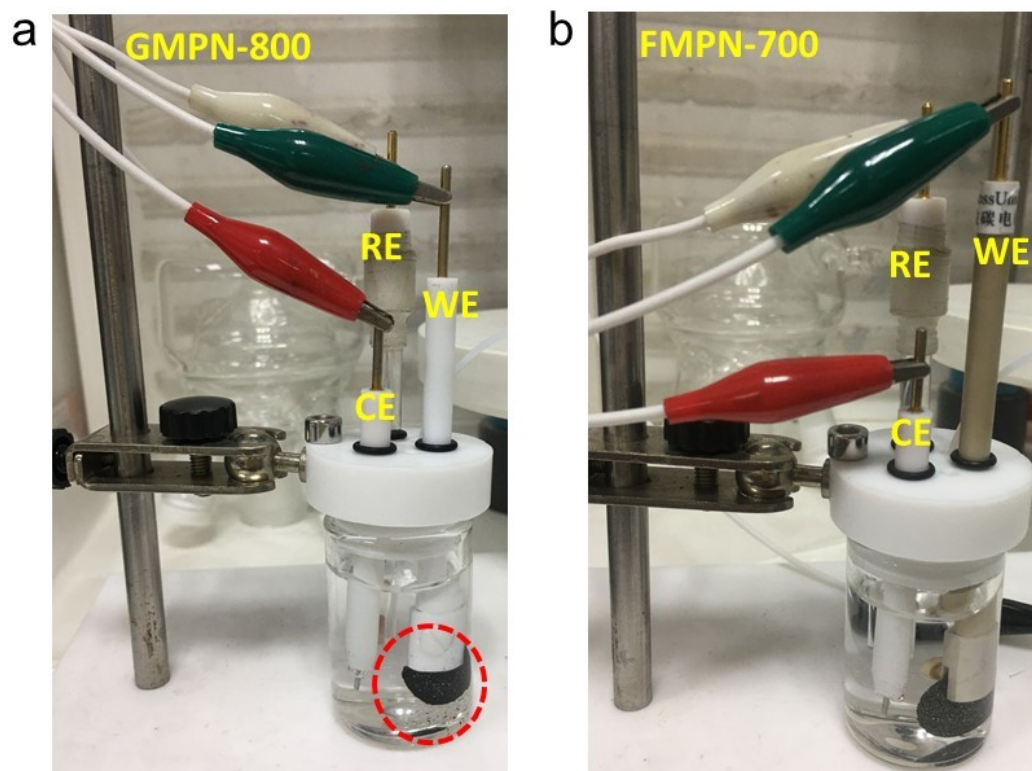


Fig. S6 Digital photos of the GMPN-800 (a) and FMPN-700 (b) working electrodes during electrochemical measurement.

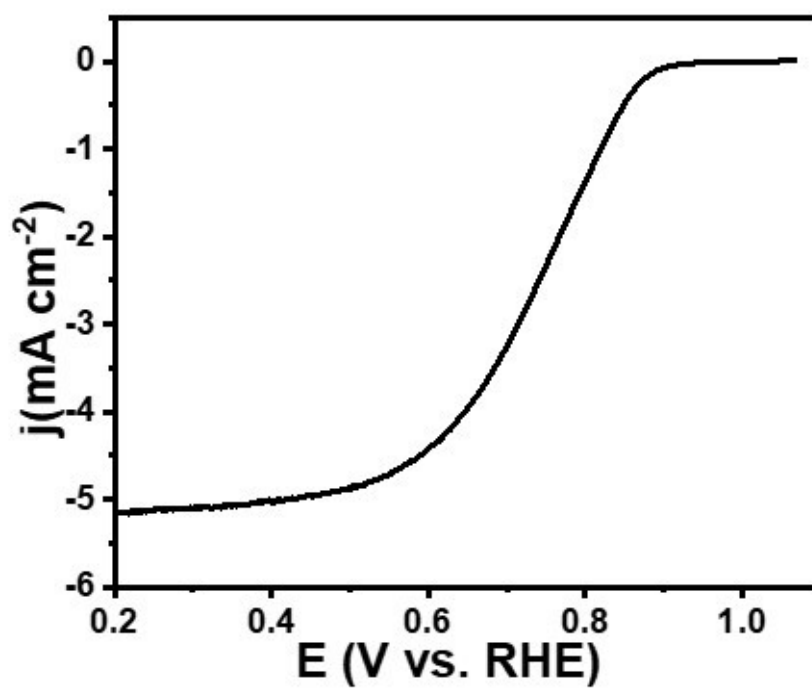


Fig. S7 LSV curve of the FMPN-700-acid catalyst on the RDE by LSV at 1600 rpm.

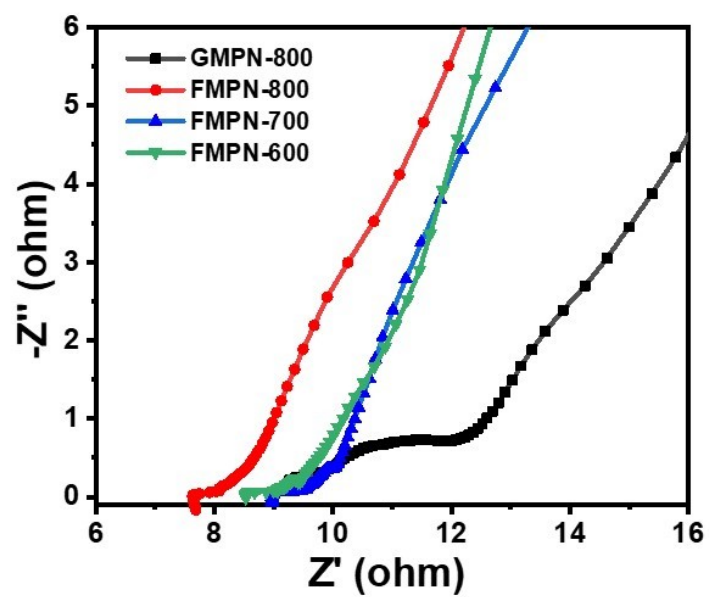


Fig. S8 Nyquist plots of GMPN-800, FMPN-800, FMPN-700 and FMPN-600.