Supporting Information

Rh Particles in N-doped Porous Carbon Materials Derived from ZIF-8 as An Efficient Bifunctional Electrocatalyst for ORR and HER

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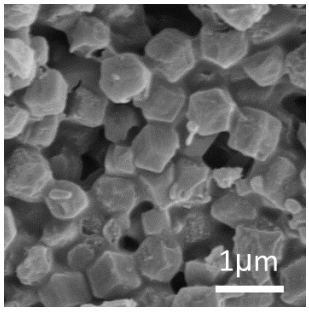

Fig. S1 SEM images of Glu-ZIF.

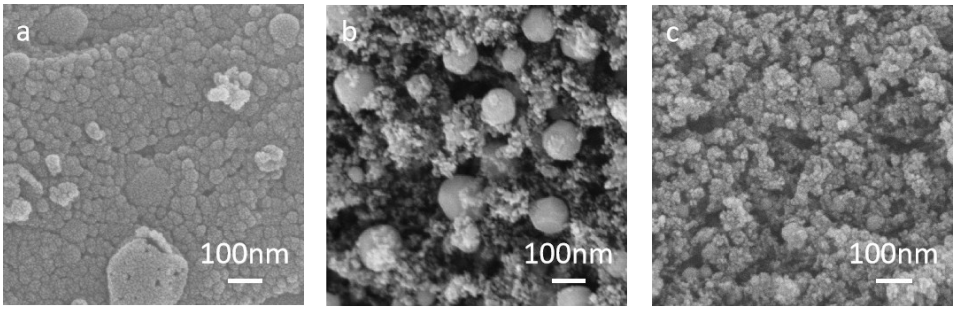

Fig. S2 SEM images of (a) RhNC-800, (b) RhNC-900 and (c) RhNC-1000.

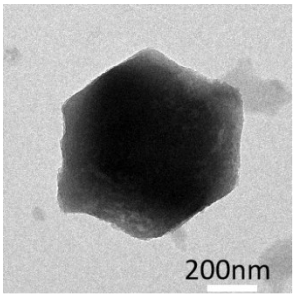

Fig. S3 TEM image of Rh-ZIF.

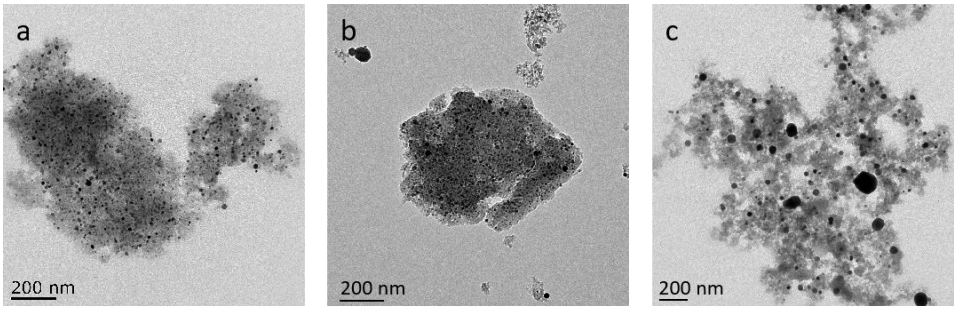

Fig. S4 TEM images of (a) RhNC-800, (b) RhNC-900 and (c) RhNC-1000 pyrolysis from Rh-ZIF.

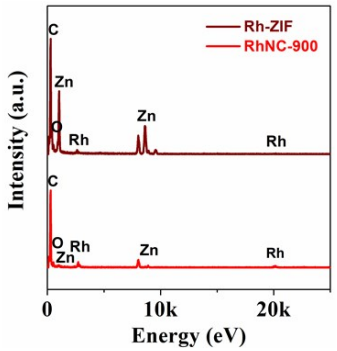

Fig. S5 EDS spectrum of Rh-ZIF and RhNC-900.

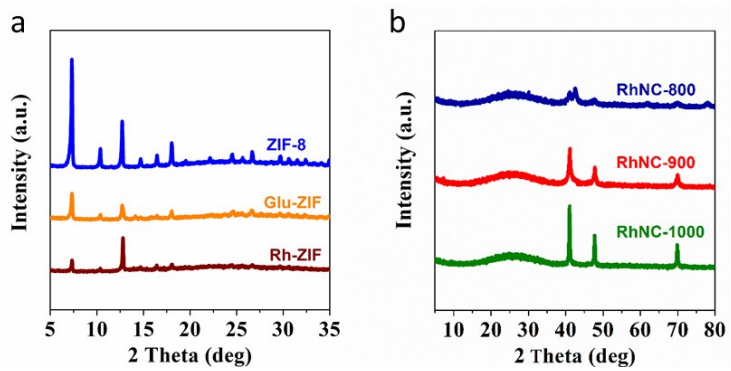

Fig. S6 XRD patterns of (a) ZIF-8, Glu-ZIF and Rh-ZIF, and (b) RhNC-800, 900 and 1000.

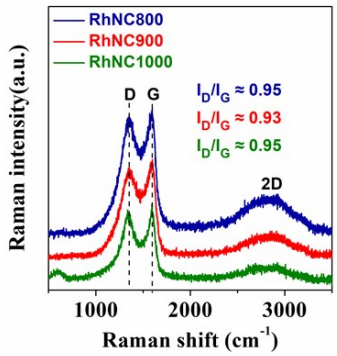

Fig. S7 Raman spectra of RhNC-800, 900 and 1000.

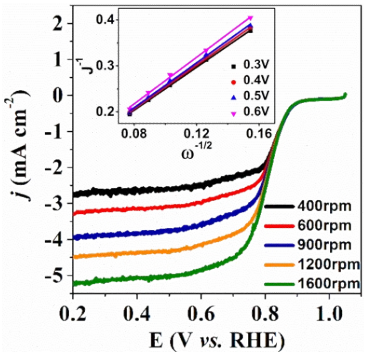

Fig. S8. LSV curves of RhNC-900 at different rotation rates (rpm). The inset shows K–L plots obtained from LSVs at different potentials.

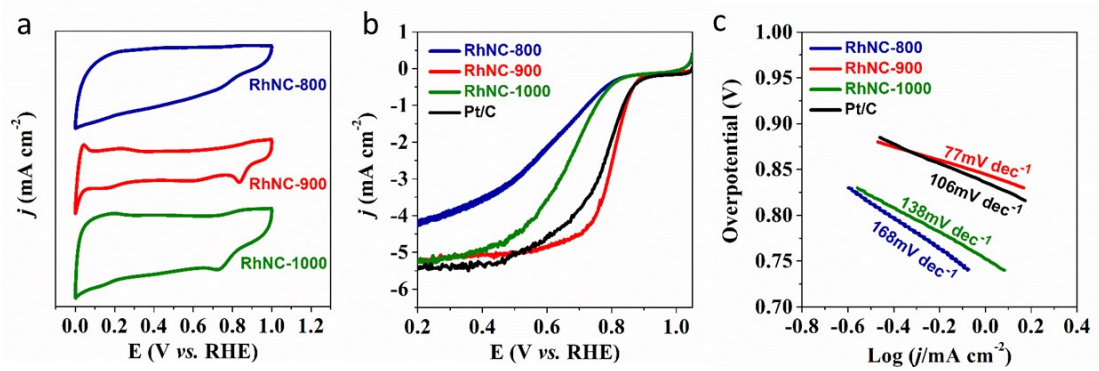

Fig. S9 Electrochemical oxygen reduction of samples. (a) CV curves of RhNC-T under O_2- saturated 0.1 M KOH solution. (b) LSV curves and (c) tafel slopes of RhNC-T and Pt/C catalysts obtained at an RDE (1600 rpm.) recorded in O_2- saturated 0.1 M KOH solution.

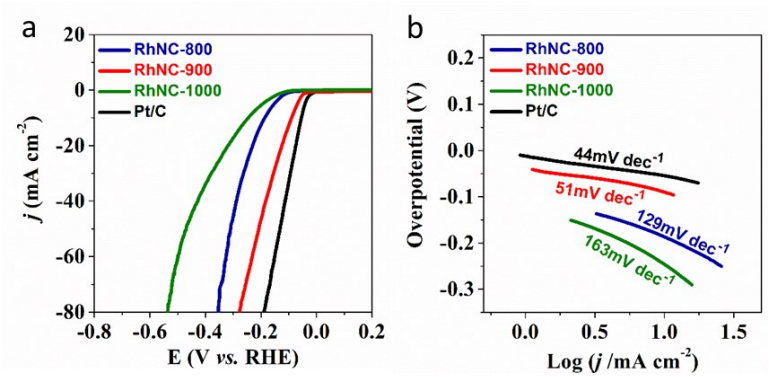

Fig. S10 Electrochemical hydrogen reduction of samples. (a) LSV curves and (b) tafel slopes of RhNC-T and Pt/C catalysts obtained at an RDE (1600 rpm.) recorded in N_2-saturated 0.5M H_2SO_4 solution.

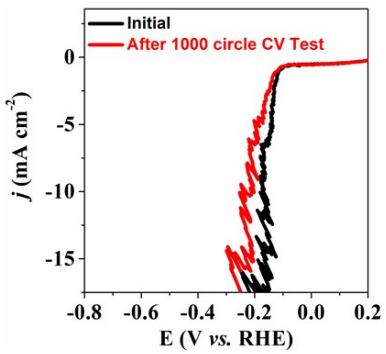

Fig. S11 LSV curves of RhNC-900 loaded on glass-carbon electrodes in N_2- saturated 0.5 M H_2SO_4 solution before and after CV test.

Table S1 Element content for NC-900 tested by XPS and RhNC-900 tested by XPS and ICP.

Sample	XPS (at.%)					ICP (wt.%)	
	C	O	N	Rh	Zn	Rh	Zn
NC-900	81.83	10.50	6.54	/	1.13	/	/
RhNC-900	80.91	10.01	6.13	0.04	0.01	1.47	14.67