Supplementary Table ST1: Binding energy for the Ni2P, Fe2P, Zn2P, O1s of $NiFe_2O_4$ and $ZnFe_2O_4$

Elements		**NF**	**ZF**
		B.E. (eV)	**B.E. (eV)**
Fe_2p	**$Fe2P_{3/2}$ (O_h)**	706.15	706.91
	$Fe2P_{3/2}$ (T_h)	708.48	-
	Satellite peak	714.13	714.51
	$Fe2P_{1/2}$ (O_h)	719.52	720.76
	$Fe2P_{1/2}$ (T_h)	722.11	-
	Satellite peak	728.87	728.72
Ni_2p	**$Ni2P_{3/2}$ (O_h)**	850.32	-
	Satellite peak	857.4	-
	$Ni2P_{1/2}$ (O_h)	868.40	-
	Satellite peak	875.48	-
Zn_2p	**$Zn2P_{3/2}$**	-	1017.39
	$Zn2P_{1/2}$	-	1040.63
O_1s	-	525.46	525.24
		526.9	526.6
		529.36	528.77
		-	532.1

Supplementary Table ST2: EIS fitting parameters of samples NF and ZF symmetric and ASC devices.

Sample x	Parameters	Fresh electrode	After 1000 cycles
NF Sym.	**Rs (Ω)**	0.78	1.0
	Rct (Ω)	2.40	2.5
	R_1(Ω)	0.78	1.01
	R_2 (Ω)	1.41	1.26
	W1 (Ω/$s^{0.5}$)	0.054	1.12x10-1
	Q1 (s^N/ Ω)	1.59x10-4	3.04x10-4
	N1	9.57x10-1	9.44x10-1
	Q2(s^N/ Ω)	1.27x10-2	1.76x10-2
	N2	7.27x10-1	7.0x10-1
ZF Sym.	**Rs (Ω)**	0.72	0.8
	Rct (Ω)	5.51	7.38
	R_1 (Ω)	7.7x10-1	0.83
	R_2 (Ω)	5.18	6.45
	W1 (Ω/$s^{0.5}$)	1.4x10-2	1.23x10-1
	Q1(s^N/ Ω)	4.86x10-4	3.24x10-3
	N1	8.7x10-1	7.11x10-1
	Q2(s^N/ Ω)	-	3.76x10-1
	N2	-	1.1
Sample x	**Parameters**	**Fresh electrode**	**After 10000 cycles**
NF//ZF ASC	**Rs (Ω)**	2.61	3.0
	Rct (Ω)	2.83	3.55
	R_1 (Ω)	2.4	2.72
	R_2 (Ω)	50.9	50.0
	W1 (Ω/$s^{0.5}$)	9.53x10^{-3}	9.66x10-3
	Q1(s^N/ Ω)	1.1x10-2	1.25x10-2
	N1	0.71	0.7
	Q2(s^N/ Ω)	14.6	5.56
	N2	1.1	1.1