Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for

Nanostructured nickel sulfides: Phase evolution, characterization and electrocatalytic properties for the hydrogen evolution reaction

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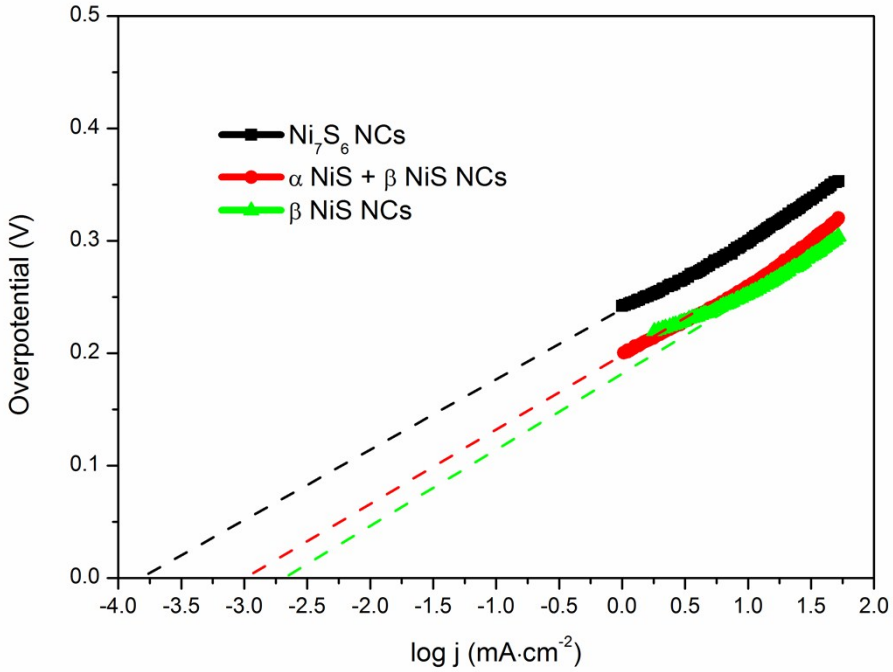

Fig. S1 Calculated exchange current density of Ni_7S_6, α NiS + β NiS and β NiS NCs by using extrapolation methods.

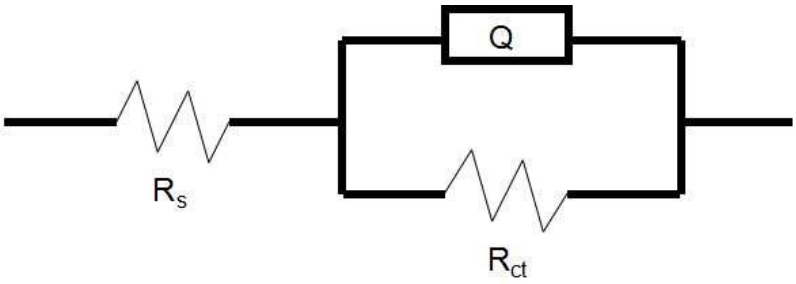

Fig. S2 Equivalent electrical circuit used to model the HER kinetics process. R_s is the solution resistance, Q is the element of the nickel sulfide NCs/electrolyte interface, R_{ct} is the charge transfer resistance at nickel sulfide NCs/electrolyte interface.

Table S1. Values of elements in equivalent circuit resulted from fitting the EIS data.

Catalyst	Potential (mV) vs. RHE	R_s (Ω)	Q ($F \cdot cm^{-2} \cdot S^{n-1}$)	n	R (Ω)
Ni_7S_6	-200	10.95	7.75E-04	0.8	2346
	-190	10.84	3.11E-04	0.8	7733
	-180	10.52	1.87E-04	0.8	13430
	-170	10.23	1.45E-04	0.8	19400
	-160	10.02	1.26E-04	0.8	24310
	-150	9.86	1.16E-04	0.8	28650
α NiS + β NiS	-200	9.77	5.89E-04	0.8	875.4
	-190	9.87	3.24E-04	0.8	3025
	-180	9.77	2.51E-04	0.8	5418
	-170	9.69	2.19E-04	0.8	8309
	-160	9.66	1.98E-04	0.8	11100
	-150	9.62	1.87E-04	0.8	13890
β NiS	-200	9.39	1.26E-03	0.8	610.2
	-190	9.56	1.05E-03	0.8	961.8
	-180	9.68	9.26E-04	0.8	1563
	-170	9.83	8.29E-04	0.8	2519
	-160	9.98	7.47E-04	0.8	4056
	-150	10.15	6.85E-04	0.8	6818