Supplementary Material

A new strategy: Fermi level control to realize 3D pyramidal NiCo-LDH/ReS_2/n-PSi as a high-performance photoanode for oxygen evolution reaction

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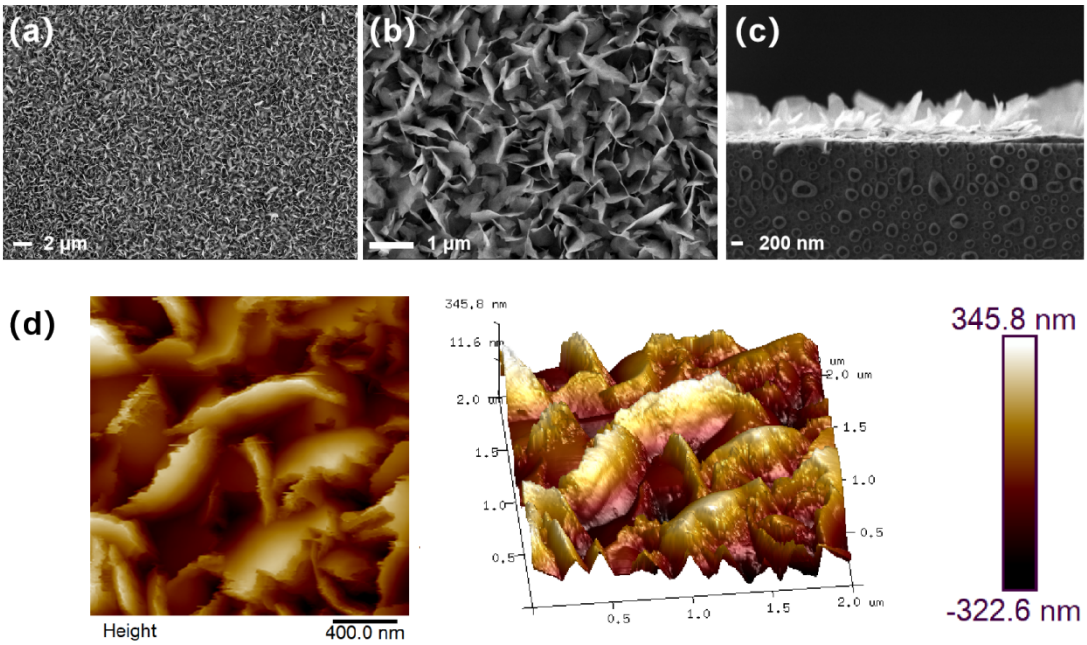

Figure S1. Top-view- and cross-sectional SEM images of the (a, b,c) planar structure of ReS_2/n-Si. (d)AFM height- and three-dimensional images of the planar ReS_2/n-Si structure.

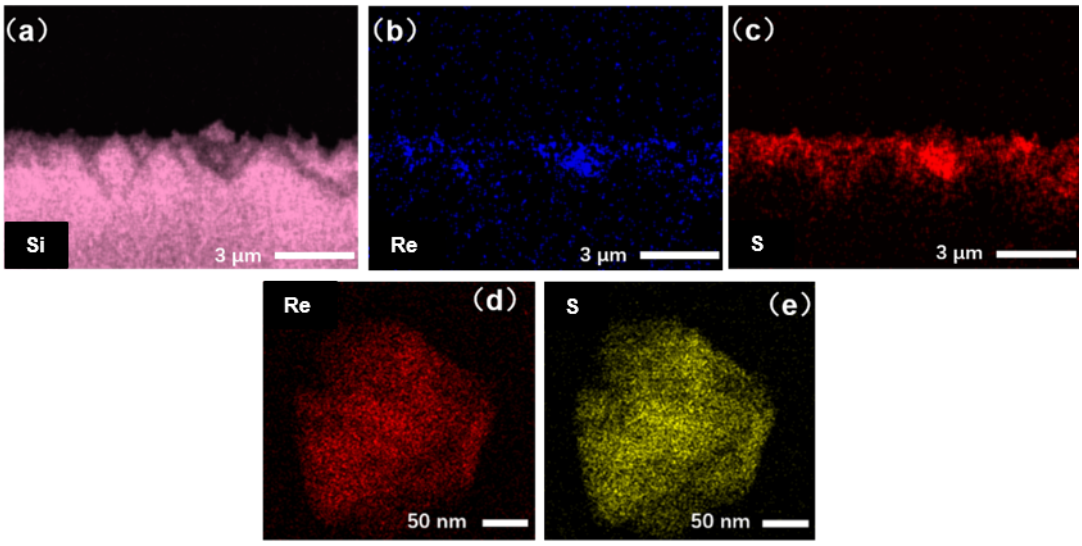

Figure S2. (a,b,c) Si, Re, and S elemental mappings from cross-sectional SEM image. (d,e) Re, and S elemental mappings from TEM image.

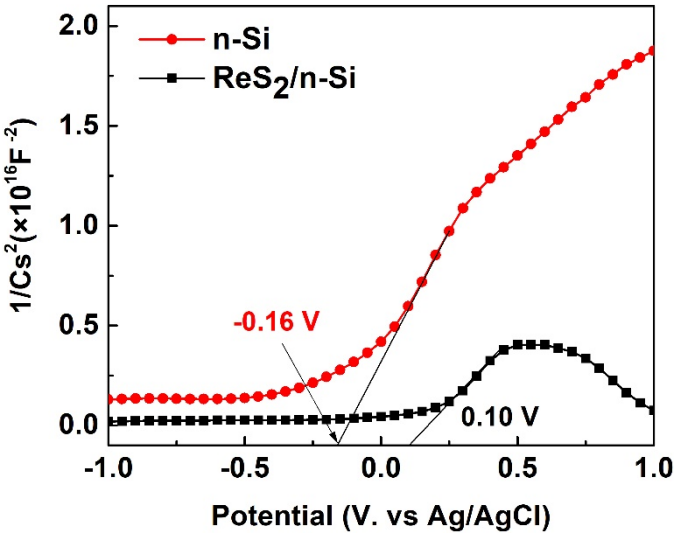

Figure S3. Mott-Schottky curve of bare planar n-Si and ReS_2/n-Si structures. The ReS_2/n-Si structure is more tend to like a p-n juncture because of the p-ReS_2.

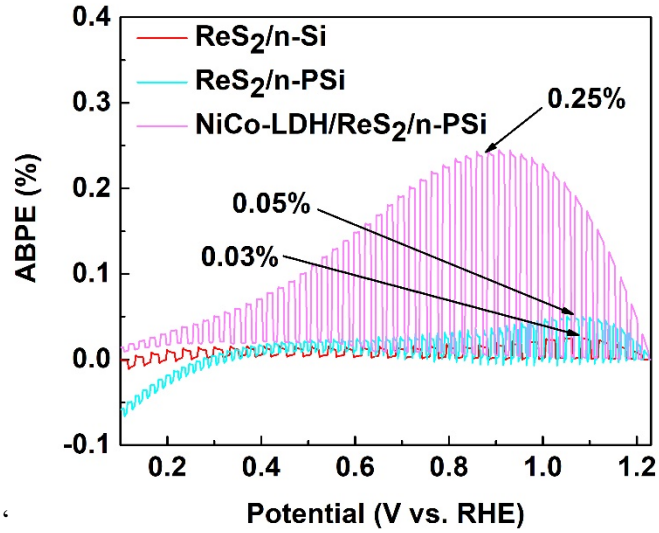

Figure S4. Photoconversion efficiency as a function of applied potential.

Table S1. A series of parameters of Si-based photoanodes in the published references and this work.

Samples	Substrates	Morphology	Electrolyte	Photocurrent density (mA cm^{-2}) at 0 V VS. RHE	ABPE(%)	Ref.
$NiCo_2O_4$/ a-C/Si	Planar Si	Film	1 M NaOH	0.59	Not mentioned	1
α-Fe_2O_3/ TiO_2/Si	Si NWs	Hierarchical structure	0.35 M Na_2SO_3 + 0.24 M Na_2S	3.5	Not mentioned	2
Bi_2O_3/Si	Si NWs	Core-shell structure	1 M NaOH	1.5	0.23	3
TiO_2/Si	Si NWs	Branched structure	0.25 M Na_2SO_4	0.35	Not mentioned	4
AuNPs@ ZnO/Si	Si NWs	Core-shell structure	0.5 M Na_2SO_4	0.12	Not mentioned	5
NiO_x/n-Si	Planar Si	Film	1 M NaOH	1.0	Not mentioned	6
Ni(Fe)O_x/ Ta_3N_5/Si	Si NWs	Core-shell structure	1 M NaOH	2.4	Not mentioned	7
Co_3O_4/TiO_2/ Si	Planar Si	MOFs-derived Nanorod	1 M NaOH	2.71	0.54	8
NiCo-LDH /ReS_2/n-PSi	Pyramidal Si	3D Nanosheets	0.5 M Na_2SO_4	1.74	0.25	**This work**

Reference

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