Supporting Information for

High-Index-Faceted Ni_3S_2 Branch Arrays as Bifunctional Electrocatalysts for Efficient Water Splitting

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Supplementary Figures

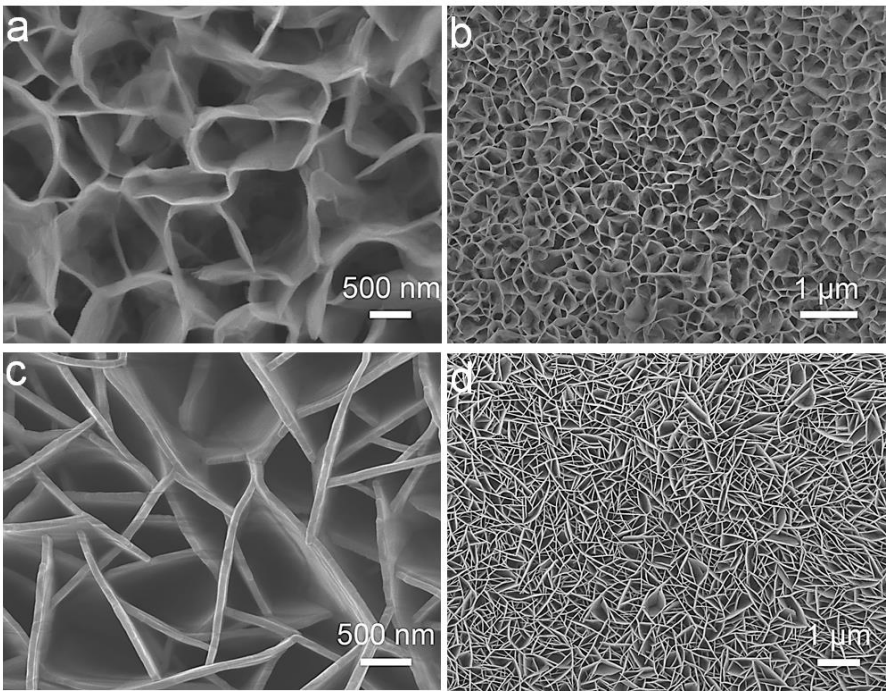

Fig. S1 SEM images of $Ni_2(OH)_2CO_3$ and TiO_2@$Ni_2(OH)_2CO_3$ nanoflake arrays

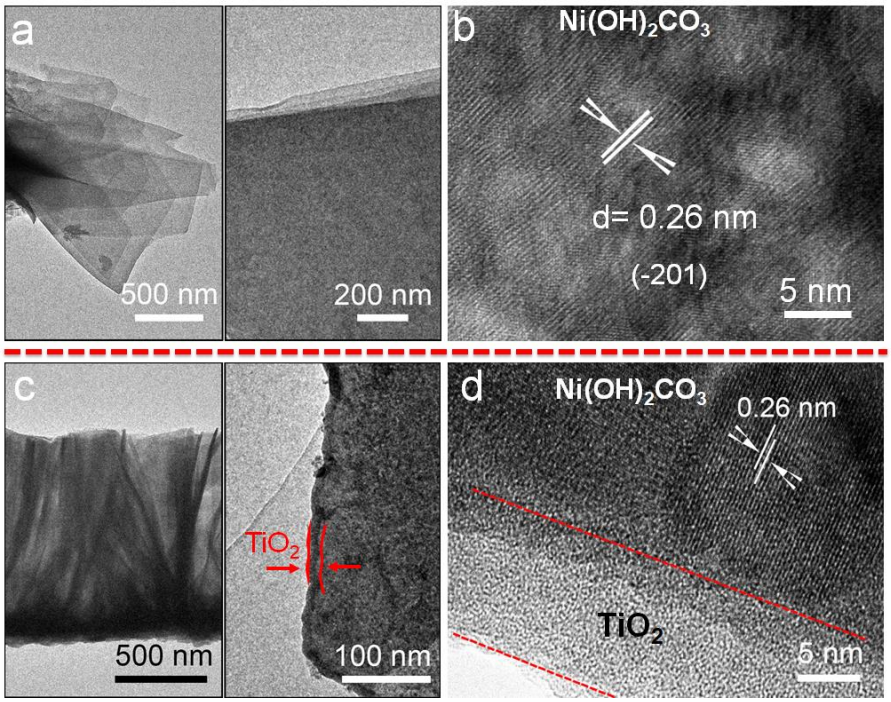

Fig. S2 TEM images of $Ni_2(OH)_2CO_3$ and TiO_2@$Ni_2(OH)_2CO_3$ nanoflakes

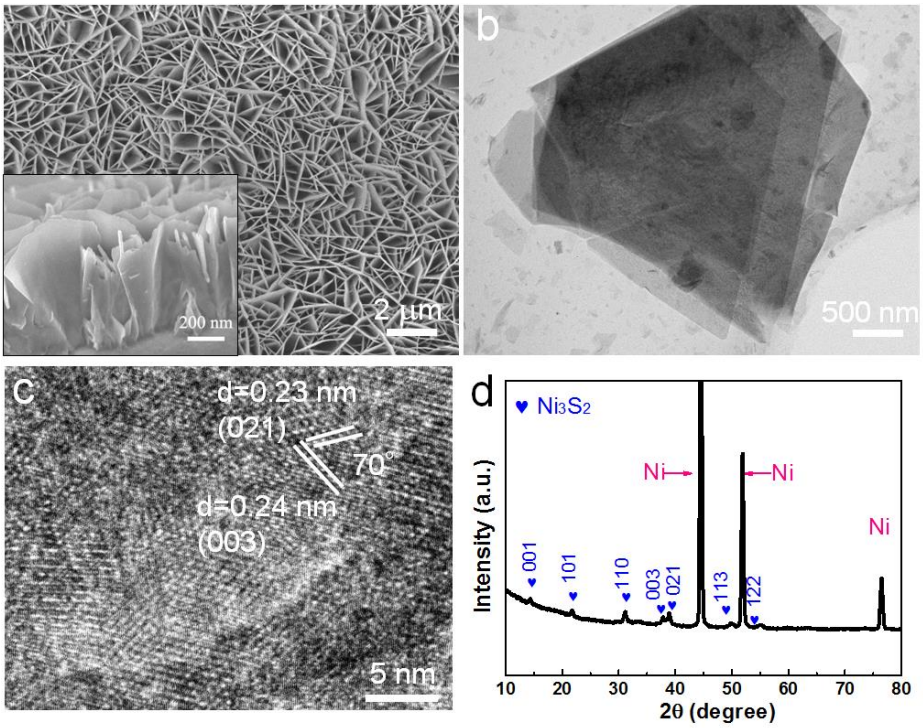

Fig. S3 Morphology and structure of control sample of pure Ni_3S_2 nanoflake arrays prepared without the TiO_2 support: **a** SEM image (fine structure in inset); **b, c** TEM-HRTEM images; **d** XRD pattern

SEM image (**Fig. S3**a) presents the uniform distribution of Ni_3S_2 nanoflakes on the nickel foam. TEM-HRTEM images (**Fig. S3**b, c) show the formation of regular Ni_3S_2 nanoflakes. When the HRTEM image is performed along the [100] crystallographic direction of Ni_3S_2, the (003) and (021) plane as well as the interior angle between the (003) and (021) facets of ~70° can be still detected, which is also corresponding with the exposed $\{\bar{2}10\}$ facet. XRD pattern further suggests the successful preparation of Ni_3S_2 (JCPDS 44-1418) (**Fig. S3**d).

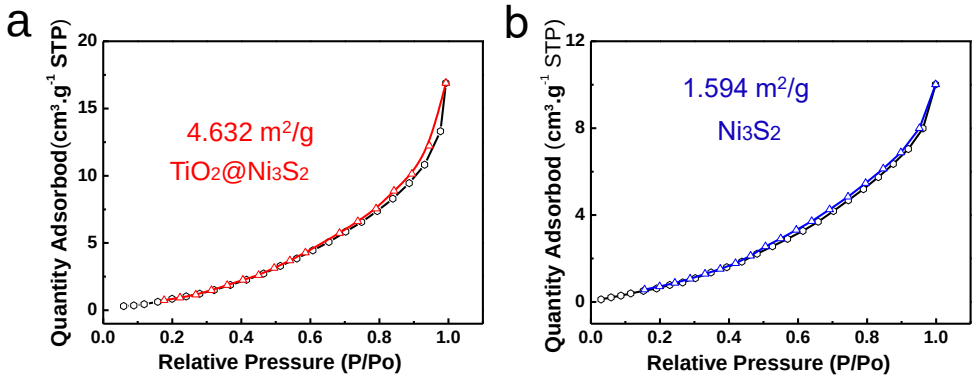

Fig. S4 BET measurements: nitrogen adsorption-desorption isotherm curves: **a** TiO_2 @Ni_3S_2 nanowire arrays and **b** Ni_3S_2 arrays

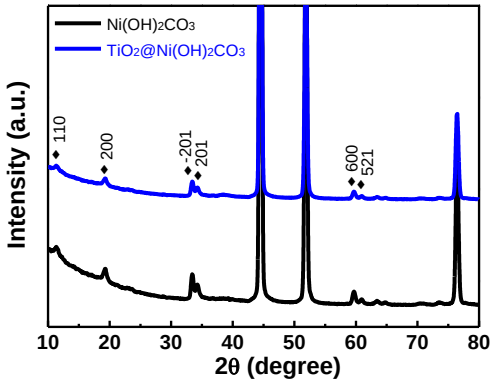

Fig. S5 XRD pattern of $Ni_2(OH)_2CO_3$ and $TiO_2@Ni_2(OH)_2CO_3$ arrays

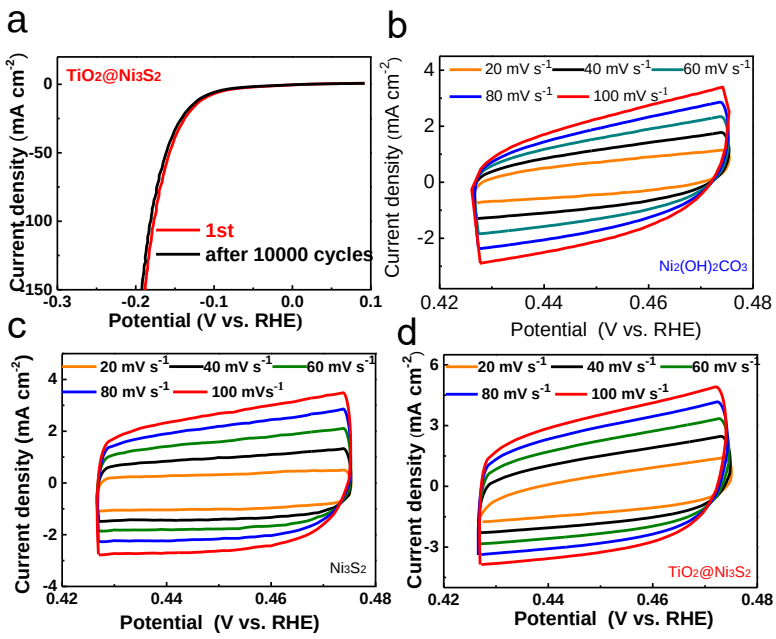

Fig. S6 a LSV plots for HER of the $TiO_2@Ni_3S_2$ electrode in the first and after 10,000 cycles. CV curves of different electrodes in double layer region at various scan rates: **b** $Ni_2(OH)_2CO_3$, **c** Ni_3S_2, and **d** $TiO_2@Ni_3S_2$ electrodes

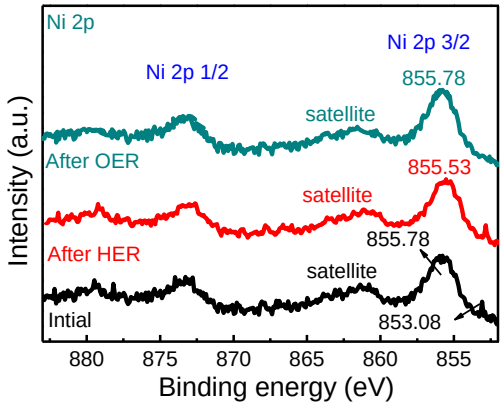

Fig. S7 XPS spectra of Ni 2p: **a** Initial state, **b** After HER and **c** After OER tests