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# In situ confined vertical growth of a 1D-$CuCo_2S_4$ nanoarray on Ni foam covered by a 3D-PANI mesh layer to form a self-supporting hierarchical structure for high-efficiency oxygen evolution catalysis

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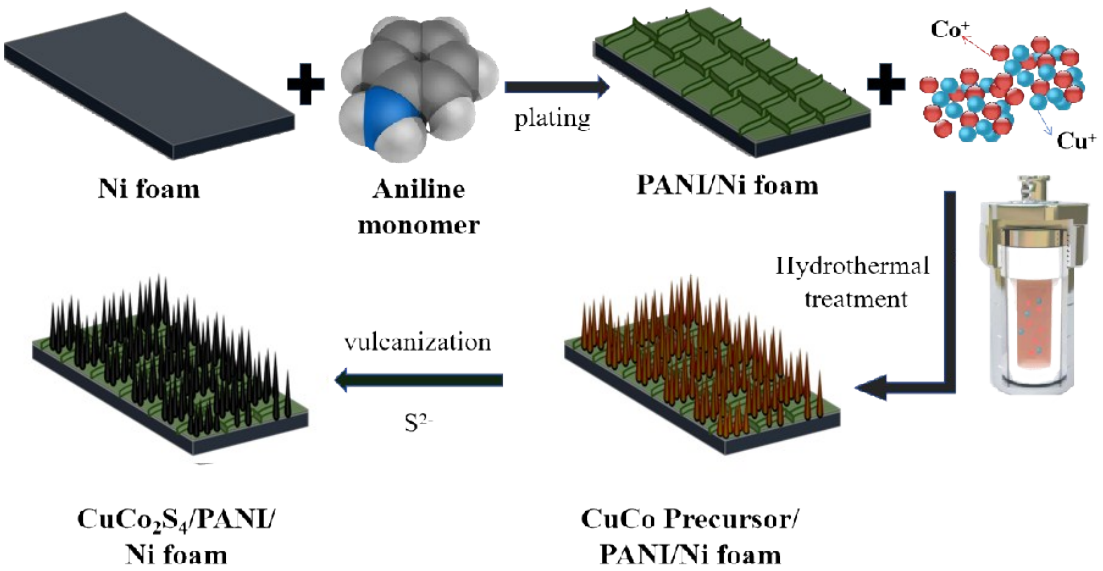


**Figure S1**.The synthesis mechanism of self-supporting $CuCo_2S_4$/PANI/NF

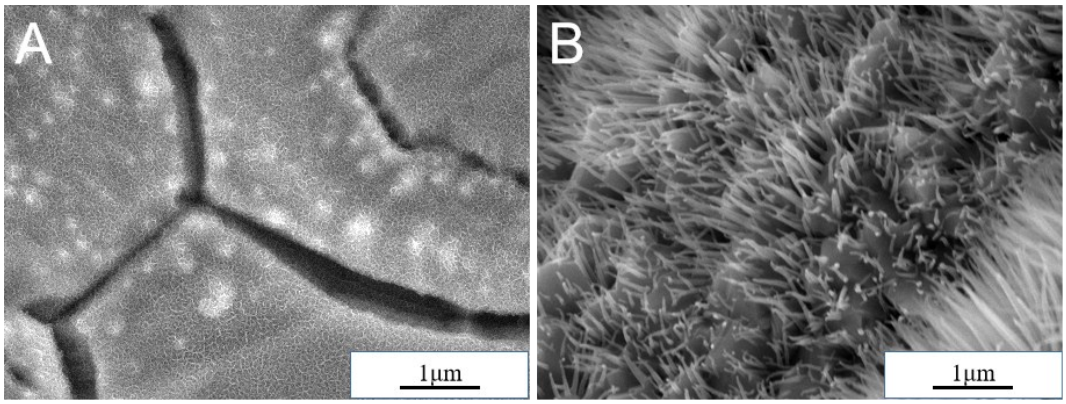


**Figure S2**. SEM images of PANI/NF(A) and $CuCo_2S_4$/PANI/NF(B)

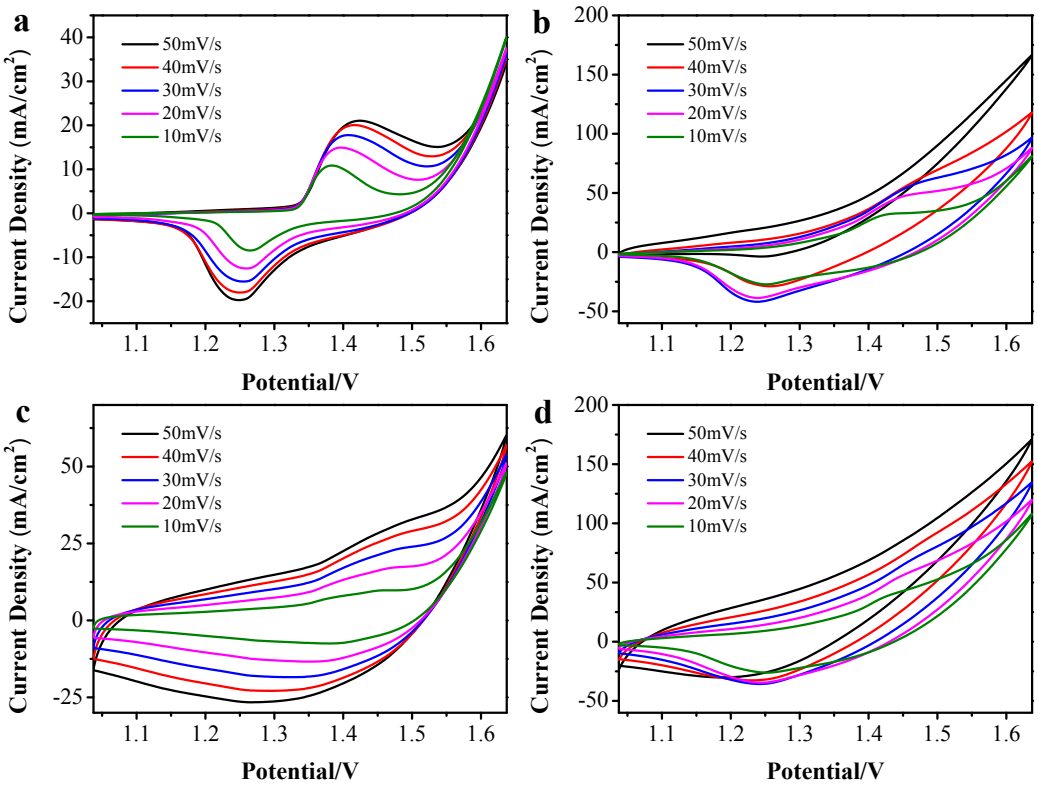


**Figure S3**. CV curves at different scan rates: PANI/NF(a), $CuCo_2S_4$/NF(b), $CuCo_2O_4$/PANI/CF(c), $CuCo_2S_4$/PANI/CF(d)

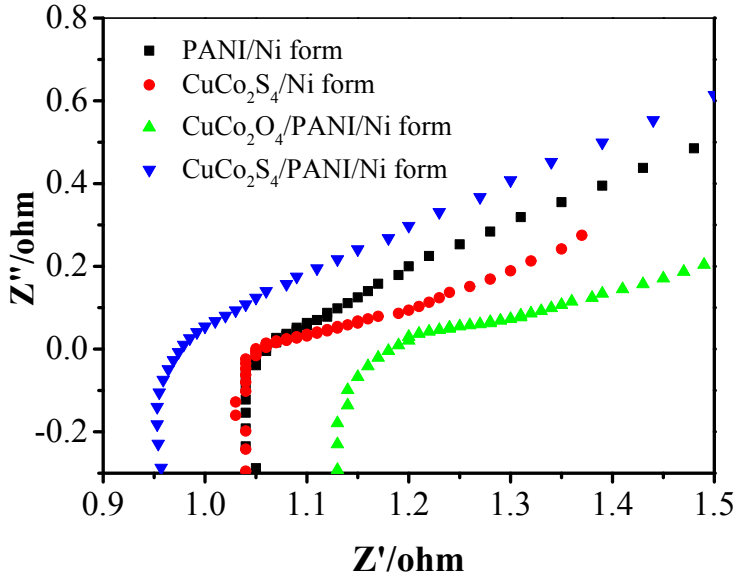


**Figure S4**. Nyquist plots of as-prepared samples