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# Hollow $Ni_3S_4$@$Co_3S_4$ with core-satellite nanostructure derived from Metal-organic framework (MOF)-on-MOF hybrids as electrode material for supercapacitor

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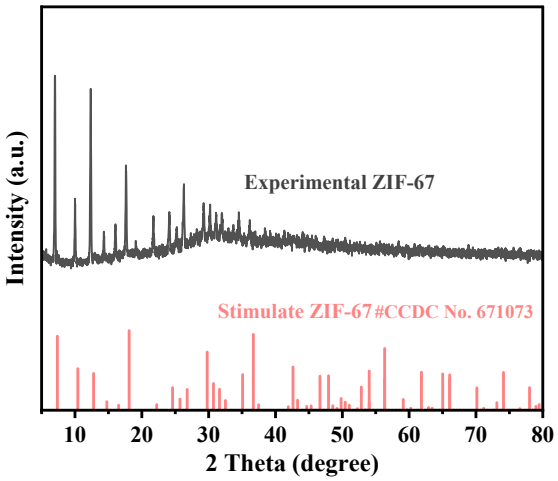


**Figure S1** XRD patterns of ZIF-67.

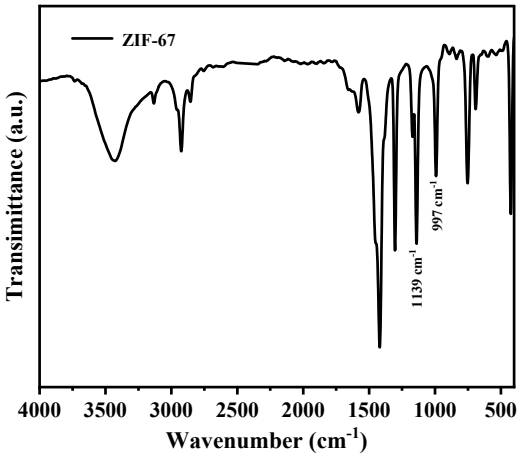


**Figure S2** FT-IR spectra of ZIF-67.

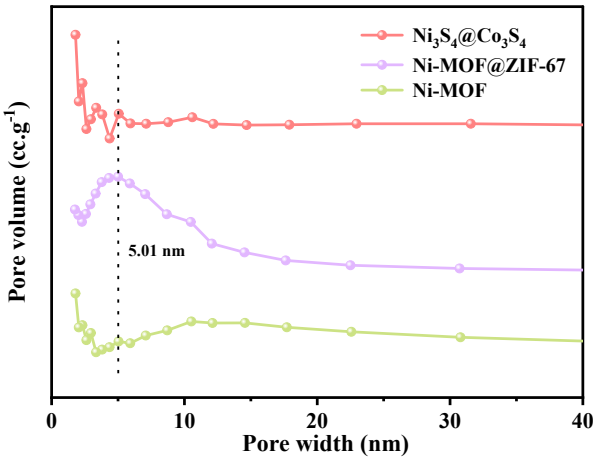


**Figure S3** BJH pore-size distribution curve Ni-MOF, Ni-MOF@ZIF-67 and $Ni_3S_4$@$Co_3S_4$.

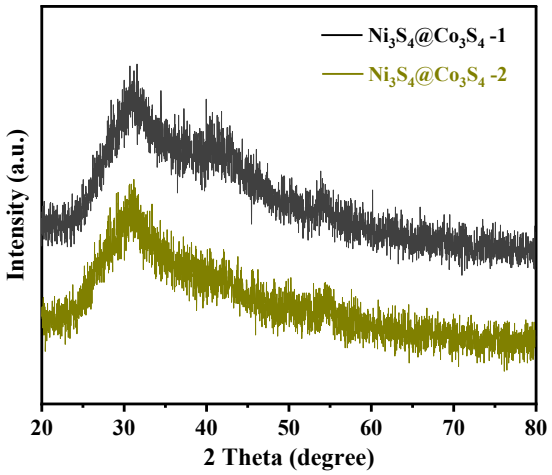


**Figure S4** XRD patterns of $Ni_3S_4$@$Co_3S_4$-1 and $Ni_3S_4$@$Co_3S_4$-2.

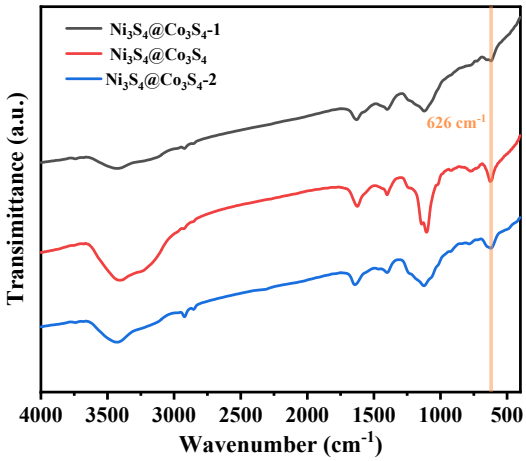


**Figure S5** FT-IR spectra of $Ni_3S_4$@$Co_3S_4$-1, $Ni_3S_4$@$Co_3S_4$ and $Ni_3S_4$@$Co_3S_4$-2.

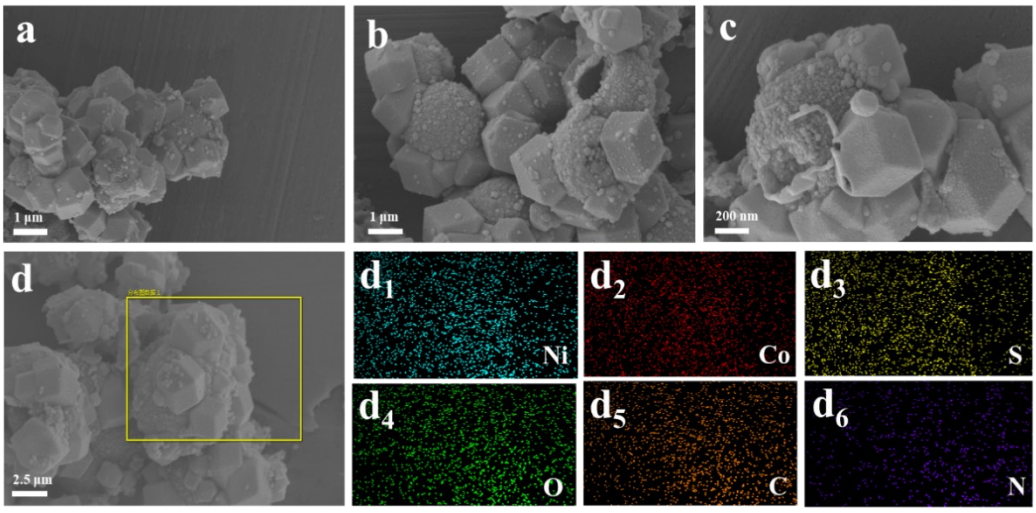


**Figure S6** (a-c) SEM images and ($d_1$-$d_6$) EDS elemental mapping images of $Ni_3S_4$@$Co_3S_4$-1.

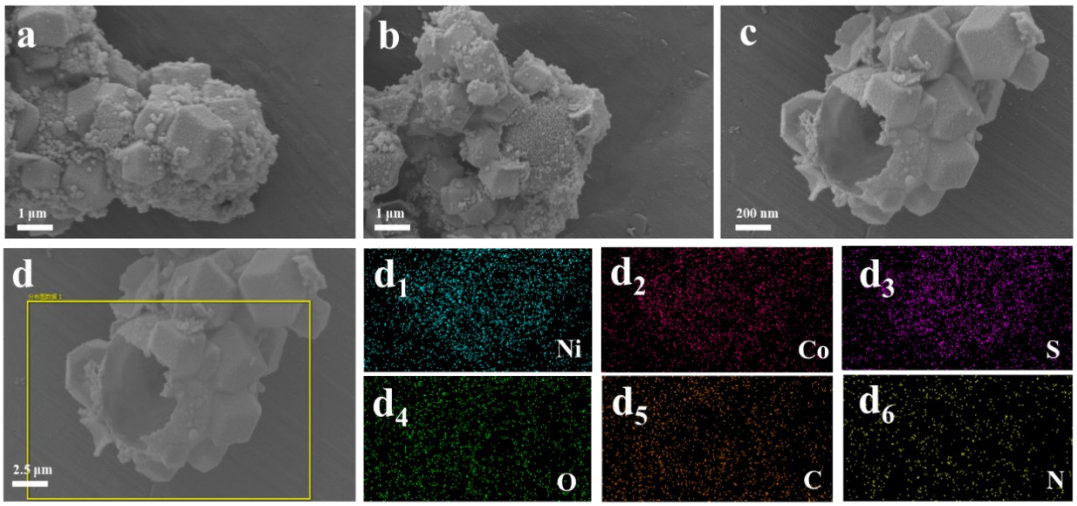


**Figure S7** (a-c) SEM images and ($d_1$-$d_6$) EDS elemental mapping images of $Ni_3S_4$@$Co_3S_4$-2.

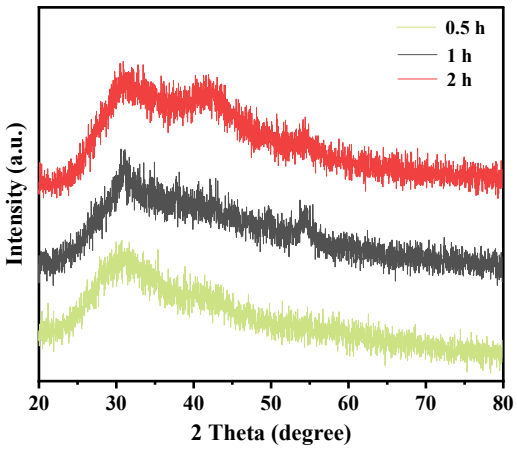


**Figure S8** XRD and FT-IR spectra of sulfurization 0.5h, 1h and 2h.

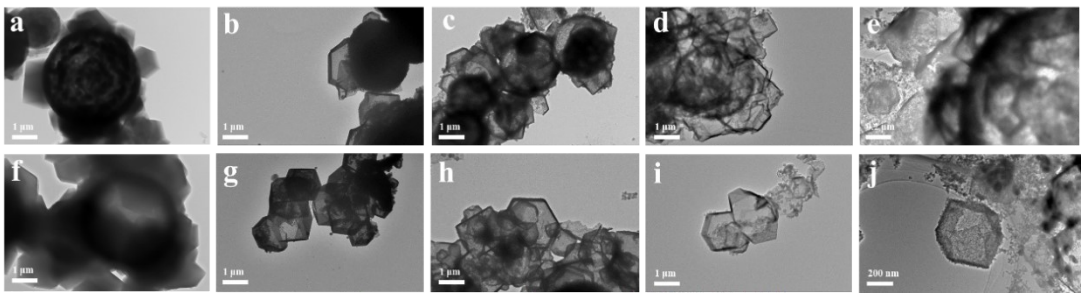


**Figure S9** TEM images of sulfidation time (a, f) 0 h, (b, g) 0.5 h, (c, h) 1h, (d, i) 2 h, (e, j) 4 h

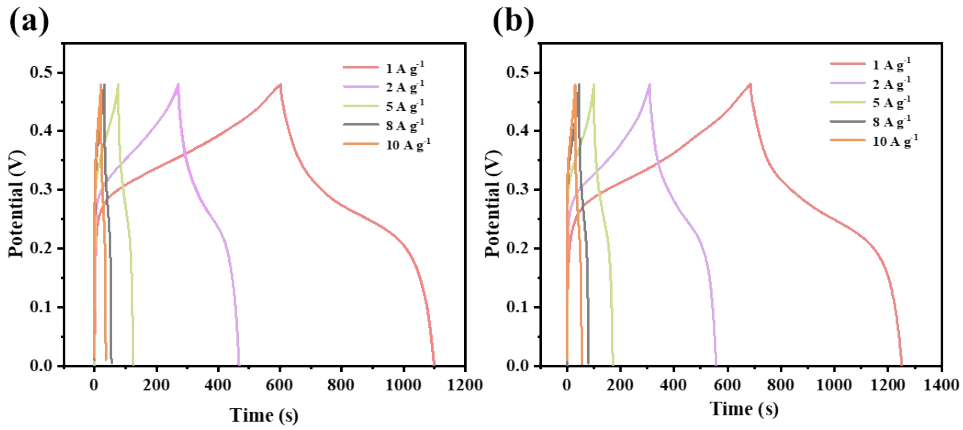


**Figure S10** (a) $Ni_3S_4$@$Co_3S_4$-1 and (b) $Ni_3S_4$@$Co_3S_4$-2 GCD curves from 1 A $g^{-1}$ to 10 A $g^{-1}$.

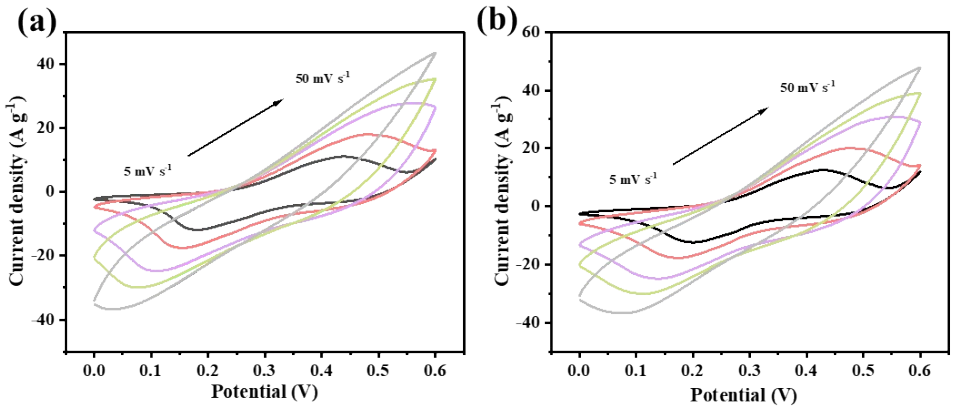


**Figure S11** (a) $Ni_3S_4$@$Co_3S_4$-1 and (b) $Ni_3S_4$@$Co_3S_4$-2 CV curves from 5 to 50 mV $s^{-1}$.

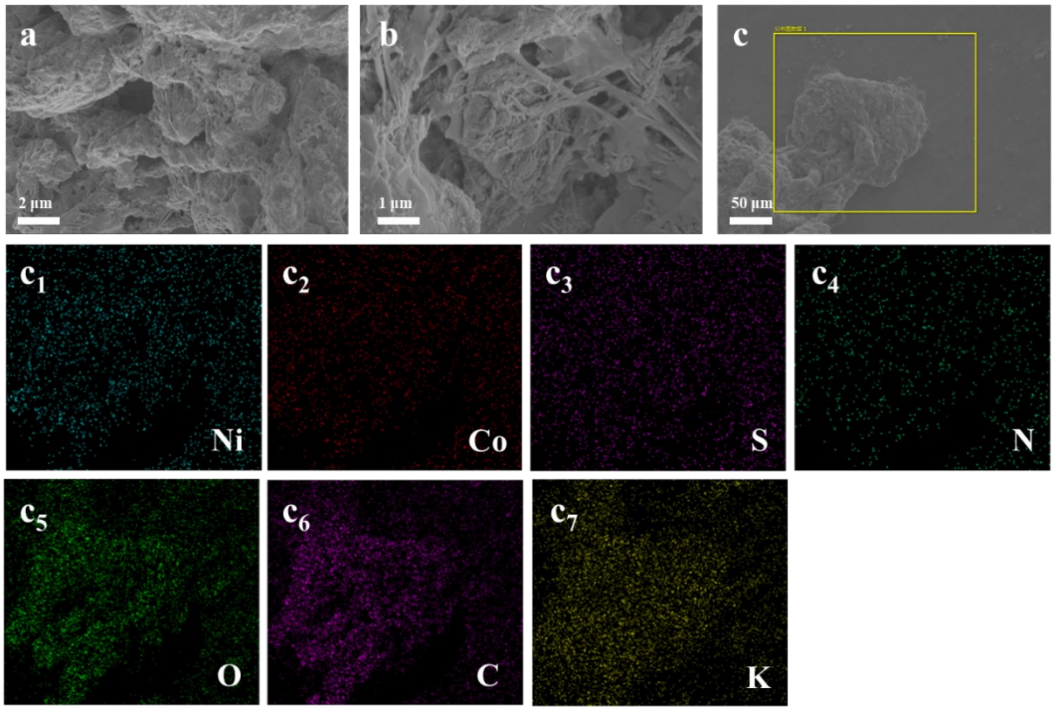


**Figure S12** (a-c) SEM images, ($c_1$-$c_7$) EDS elemental mapping pictures of $Ni_3S_4$@$Co_3S_4$ after cycling.