# Supplementary Information

# A Perspective on Protective Carbon Shells for Improved Stability of Alkaline Water Oxidation Electrocatalysts

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**Table 1.** Summary of Example Carbon Core-Shell OER Electrocatalysts: Their Properties and Carbon Corrosion

| sample | NP size (nm) | carbon layer thickness (nm) | Overpotential (mV) @ 10 $mA \cdot cm^{-2}$ | long-term test | duration of long-term test | post-characterization | carbon corrosion? | ref. |
|---|---|---|---|---|---|---|---|---|
| $Fe_3C$@C-N | 10-40 | - | 420 | CA, 1.70 V vs RHE | > 13.8 h | XRD, TEM, $CO_2$ detection | Yes | [1] |
| $Fe_3C$@C | - | - | - | CA, 1.70 V vs RHE | > 13.8 h | - | Yes | [1] |
| $Fe_3C$ (no carbon layer) | - | - | - | CA, 1.70 V vs RHE | <1.5 h | - | Yes | [1] |
| $FO_{800}$ | 30 to 40 | ~5 | 330 | CA, 1.57 V vs RHE | > 50 h | SEM, XPS | Likely | [2] |
| FeNi@N-CNT | CNT, 40 nm diameter | ~7 | 300 | Chronogalvanostatic measurements, CA, 1.56 V vs RHE | 10 h | XRD, TEM, XPS | Likely | [3] |
| Fe/$Fe_3$C-A@CNT | 5 to 10 | 1 to 2 | 292 | CP, 50 $mA \cdot cm^{-2}$ | 12 h | - | - | [4] |
| Fe/$Fe_3$C-C@CNT | >200 | 9.31 | 342 | CP, 50 $mA \cdot cm^{-2}$ | 12 h | - | - | [4] |
| Fe/$Fe_3$C-P@CNT | 200 | 0 | 341 | CP, 50 $mA \cdot cm^{-2}$ | 12 h | - | - | [4] |
| $Ni_3$Fe-$Fe_3$C@NCNTs (also referred to as NF-FC@NCNTs) | ~5 | 2-2.5 | 171 | CP, 10 $mA \cdot cm^{-2}$ | ~300 h | SEM, TEM, XRD, Raman, XPS | Likely | [5] |
| C@$CoP_2$/CC | 50-100 | 2.2 | 234 | CA, 1.52 V vs RHE | 80 h | XRD, XPS, SEM | - | [6] |
| Co/CoOx@NS-NCNTs | ~50 | ~50 | 360 | CA, 1.7 V vs RHE | 5 h | - | - | [7] |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $Fe_3C$@NG800-0.2 | ≥4 | 0-25 | 361 | CA, 1.59 V vs RHE | 20 h | - | - | 8 |
| Co@$Co_3O_4$/NC-1 | 2-10 | ~8 | 330 | CP, 10 mA·cm$^{-2}$ | ~50 h | - | - | 9 |
| CoNP@NC/NG-700 | 35 | 2.8 | 390 | CA, 1.57 V vs RHE | 1.38 h | TEM | No | 10 |

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