Oxycarbide-Derived-Carbon Supported Nickel Ferrite/Copper Tungstate Ternary Composite for Enhanced Electrocatalytic Activity towards Oxygen Evolution Reaction

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Electronic Supplementary Information

1. Elemental Analysis of the SiOC before and after HF etching

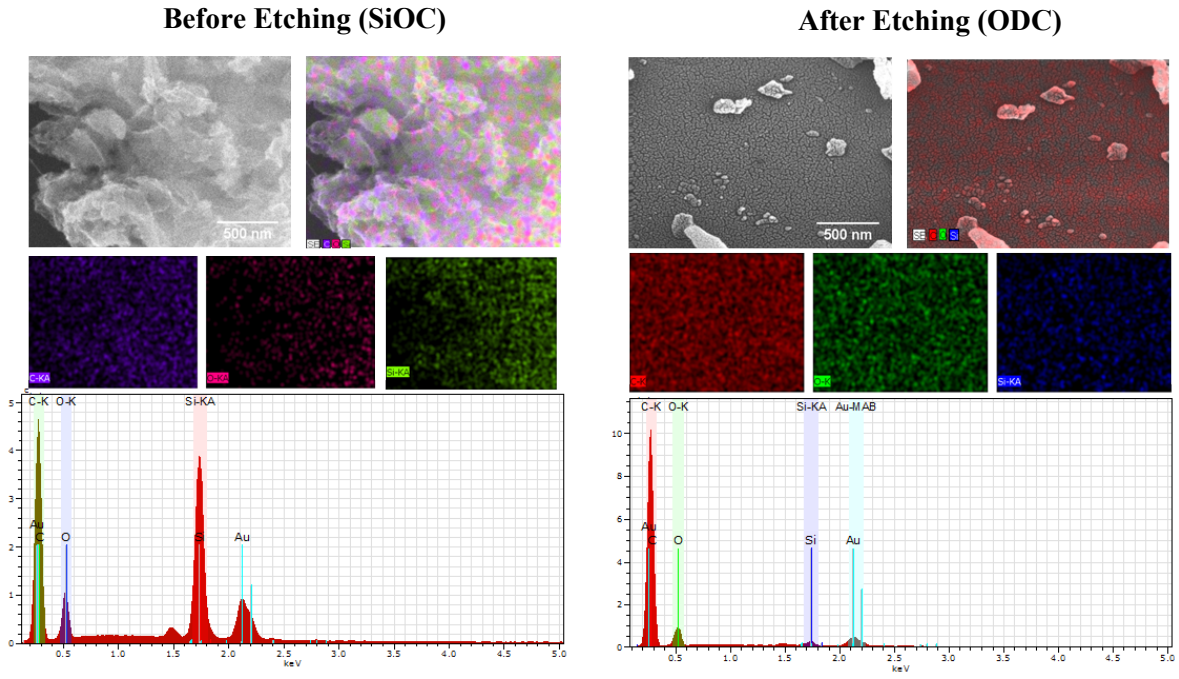

Figure S1: EDX elemental analysis and elemental color mapping of SiOC before and after etching

Table S1: Atomic (At%) and Weight (wt%) of the various elements of SiOC before and after HF etching

Elements	Before HF Etching		After HF Etching	
	Wt %	At %	Wt %	At %
Si	50.11	32.86	2.00	0.92
O	24.45	28.15	12.46	8.08
C	25.43	39.00	85.54	91.00

EDX elemental analysis of the SiOC before and after HF etching are depicted in Fig. S1. The elemental quantification reveals that there is significant decrease in the concentration of Si after etching of the SiOC ceramic.

2. XRD analysis of the spent NiF/CuW/C_{12}

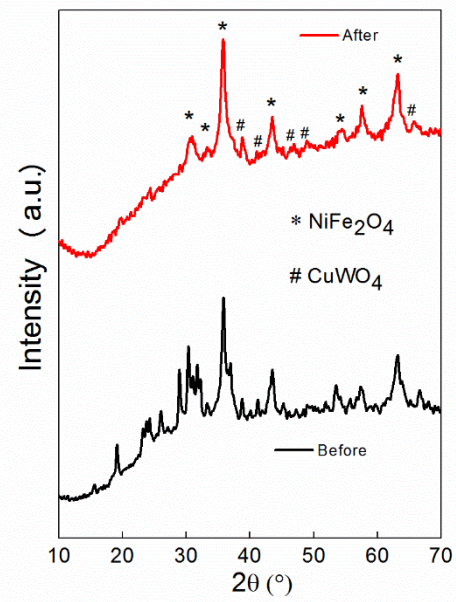

Figure S2: XRD pattern of the NiF/CuW/C_{12} sample before and after running the chronopotentiometry stability test for 24 hours.

Fig. S2 represents the XRD spectra of the NiF/CuW/C catalyst obtained upon electrocatalysis for 24 hours. The resultant XRD spectra mostly resembles that of fresh catalyst. However, it can be noticed from the XRD pattern that the catlyst undergoes detoriation in the overall intensity which may be attiributed to the reduced crystallinity. Morever, it can be noticed that the XRD peaks corresponding to the NiFe2O4 remains intact on the other hand few peaks corresponding to CuWO4 dissappeared which can be attributed to the surface passivation and the leaching out of the “W” due to the prolonged exposure in the alkaline media.

3. Elemental analysis of the spent NiF/CuW/C_{12} composite

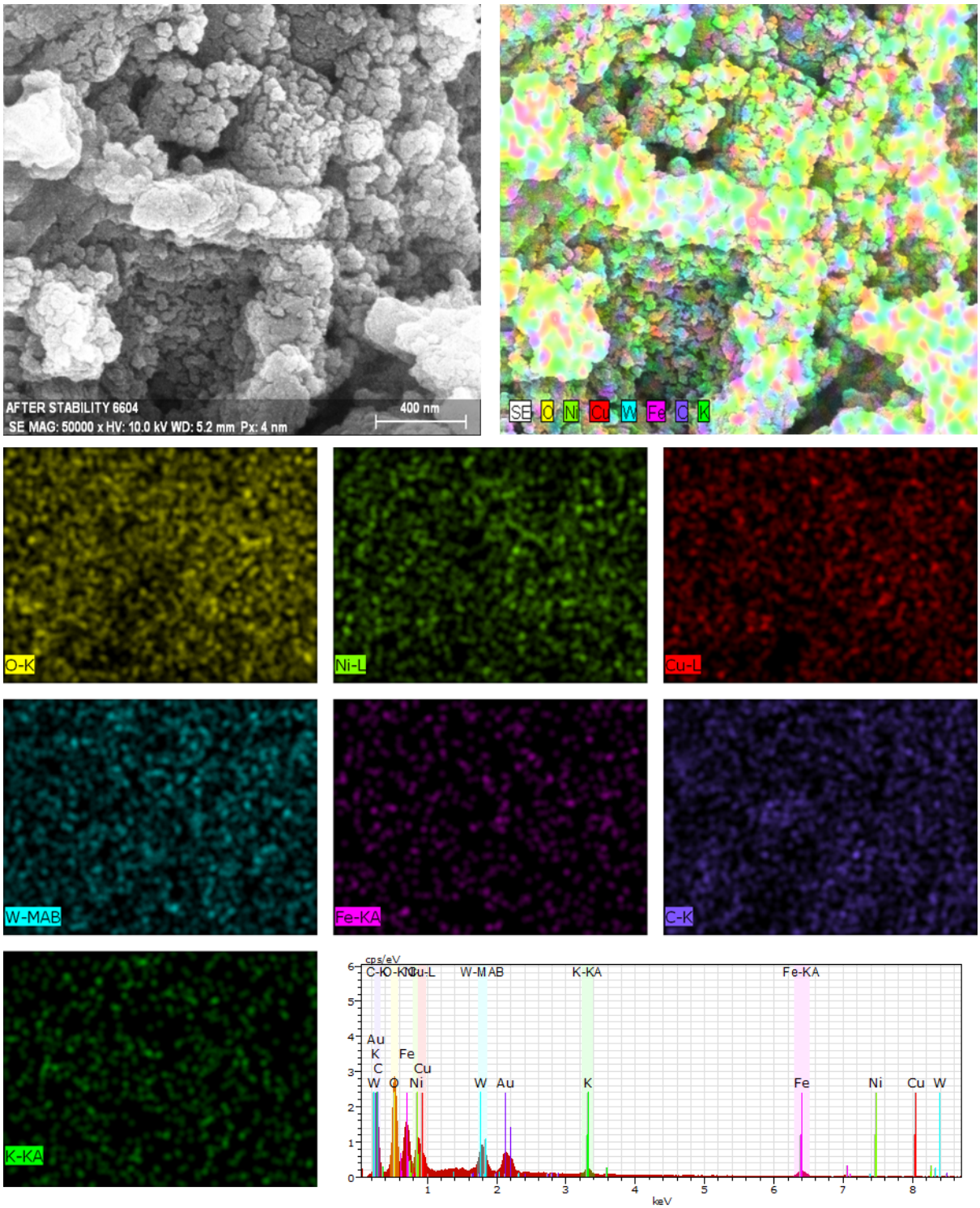

Figure S3: EDX bulk elemental analysis and color elemental mapping of the 24 hours spent NiF/CuW/C_{12} composite.

Fig. S3 represents the EDX elemental mapping of the spent NiF/CuW/C_{12} samples. The EDX represents the retention of the all the constituents of the ternary NiF/CuW/C_{12} composite except a slight reduction in the concentration of tungsten (W) from the CuW phase.

Table S2: Atomic (At%) and Weight (wt%) concentration of the various elements of NiF/CuW/C_{12} composite after and before running the chronopotentiometry experiment for 24 hours

Elements	Before Stability		After Stability	
	Wt %	At%	Wt %	At%
Ni	9.41	4.71	10.76	4.62
Fe	26.44	13.90	23.82	10.75
Cu	9.91	4.58	8.93	3.54
W	18.39	18.39	10.47	1.44
O	22.56	41.39	24.98	39.34
C	13.29	32.49	18.40	38.61
K	--	--	2.64	1.70