



Supporting Information

for

The effect of cobalt on morphology, structure, and ORR activity of electrospun carbon fibre mats in aqueous alkaline environments

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Additional experimental data

1 Elemental analysis results

Table S1: Composition of the fibres without any additives after stabilisation in air at 250 °C for 12 h and subsequent carbonisation in argon at the indicated temperatures and a holding time of 3 h. All values were determined by elemental analysis. Values are given with the standard derivation of three independent measurements of the same sample.

T_C °C	Carbon wt %	Hydrogen wt %	Nitrogen wt %	Oxygen wt %	Sum wt %
600	65.5±0.33	2.46±(<0.01)	19.8±0.28	1.8±(<0.1)	89.56±0.72
700	70.8±(<0.1)	2.09±0.06	16.1±0.22	10±0.15	98.99±0.5
800	73.8±0.28	1.5±0.08	13.6±0.27	10.9±0.47	99.8±1.1
900	82.1±0.18	1.34±0.03	5.9±0.05	11.4±0.11	100.74±0.37
1000	94.7±0.28	0.54±0.03	3.83±0.12	10.8±0.15	109.87±0.58
1100	78.3±0.3	1.5±0.03	9.29±0.23	4.44±0.2	93.53±0.76

Table S2: Composition of the fibres with initially 1.0 wt % of cobalt after stabilisation in air at 250 °C for 12 h and subsequent carbonisation in argon at the indicated temperatures and a holding time of 3 h. Contents of C, H, N, and O were determined by elemental analysis, Co content was determined by ICP-OES. Values are given with the standard derivation of three independent measurements of the same sample.

T_C °C	Carbon wt %	Hydrogen wt %	Nitrogen wt %	Oxygen wt %	Cobalt wt %	Sum wt %
600	50.8±0.19	2.03±0.01	19.5±(<0.01)	15.1±1.13	12.15±0.07	99.58±1.41
700	58.5±0.43	1.43±(<0.01)	12.9±0.34	13.4±0.3	13.76±0.11	99.99±1.19
800	67.9±0.22	1.3±0.01	8.03±0.08	10.6±0.4	8.98±0.09	96.81±0.8
900	71.4±0.38	1.14±(<0.01)	4.5±0.04	8.78±0.62	12.54±0.16	98.36±1.21
1000	76.4±0.44	0.99±0.02	2.59±0.11	6.83±0.02	12.91±0.19	99.72±0.78
1100	78.8±(<0.1)	0.83±0.07	1.71±0.11	4.89±0.1	12.5±0.2	98.73±0.58

2 XPS spectra overview of samples with cobalt

2.1 Carbon C 1s spectra

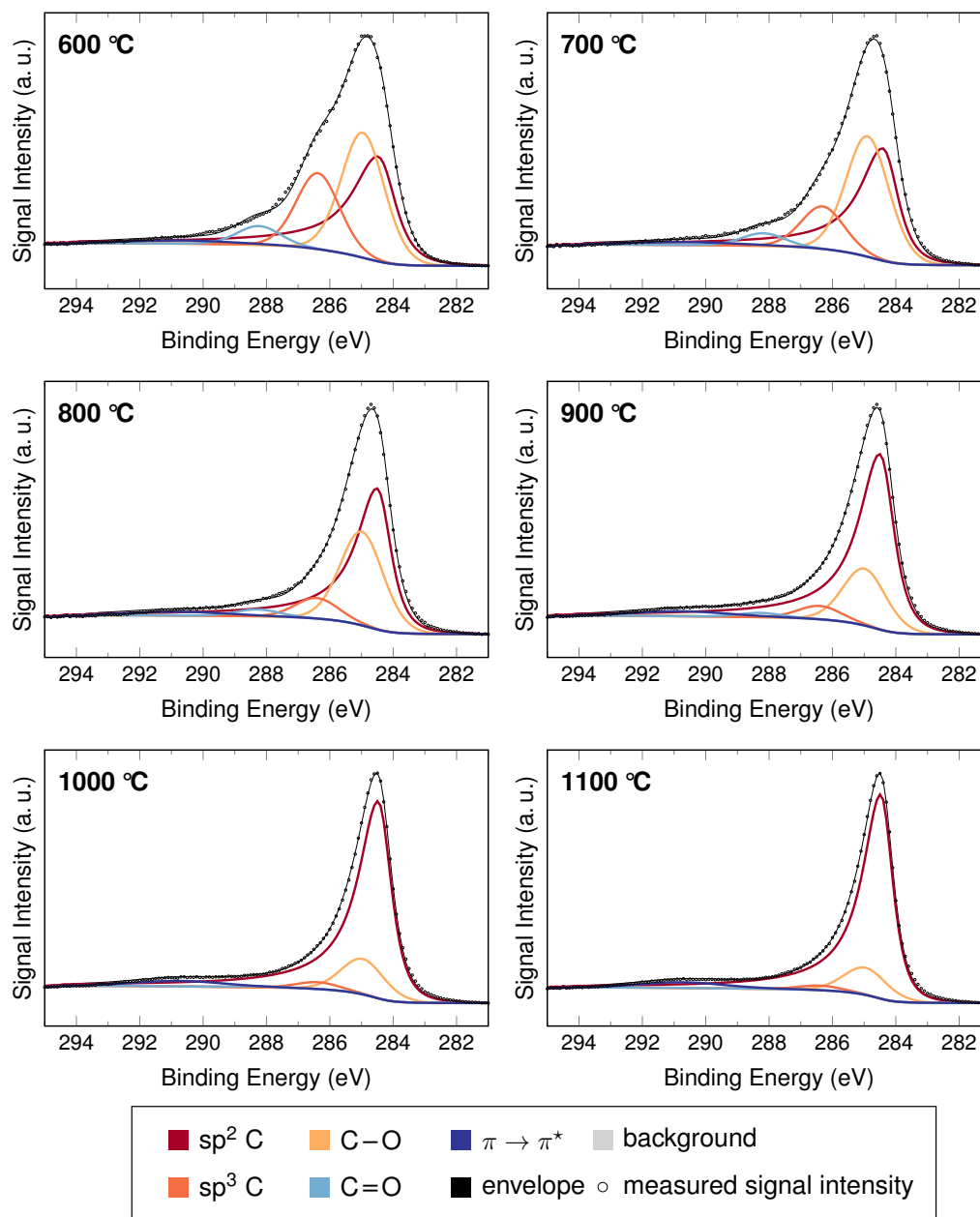


Figure S1: C 1s XPS spectra of samples containing cobalt.

2.2 Nitrogen N 1s spectra

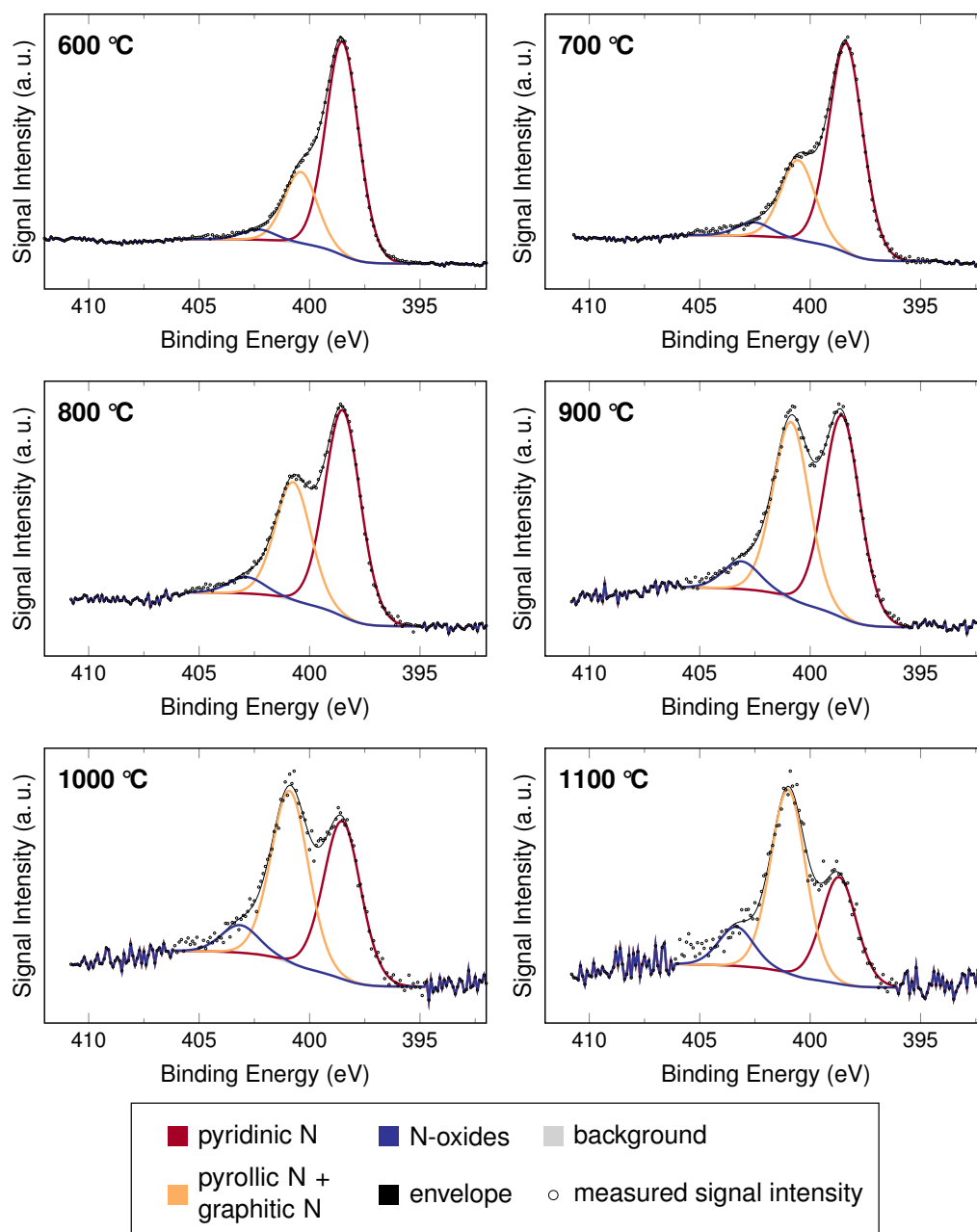


Figure S2: N 1s XPS spectra of samples containing cobalt.

2.3 Cobalt Co 2p spectra

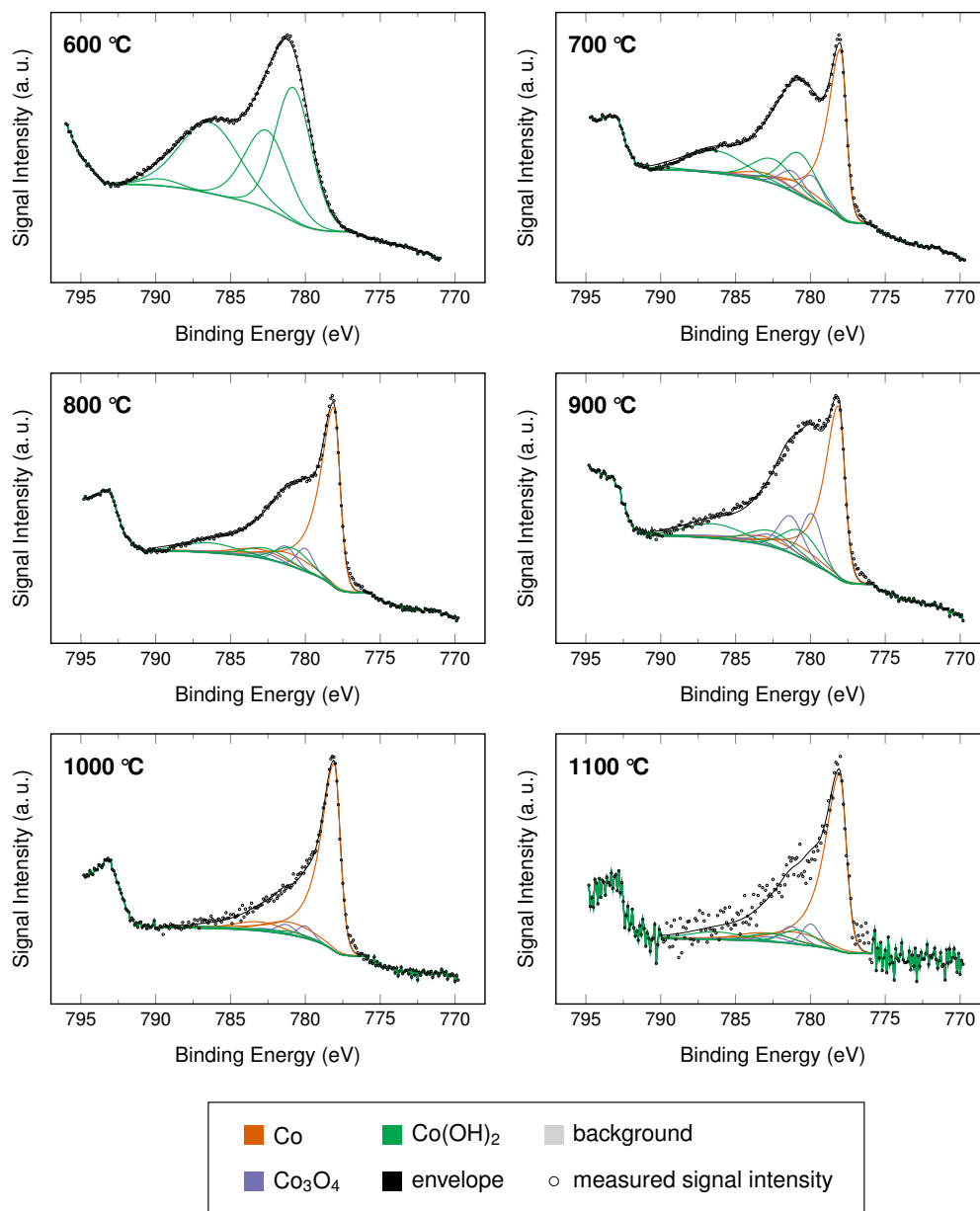


Figure S3: Co 2p XPS spectra of samples containing cobalt.

3 LSV measurement data

3.1 Samples with cobalt

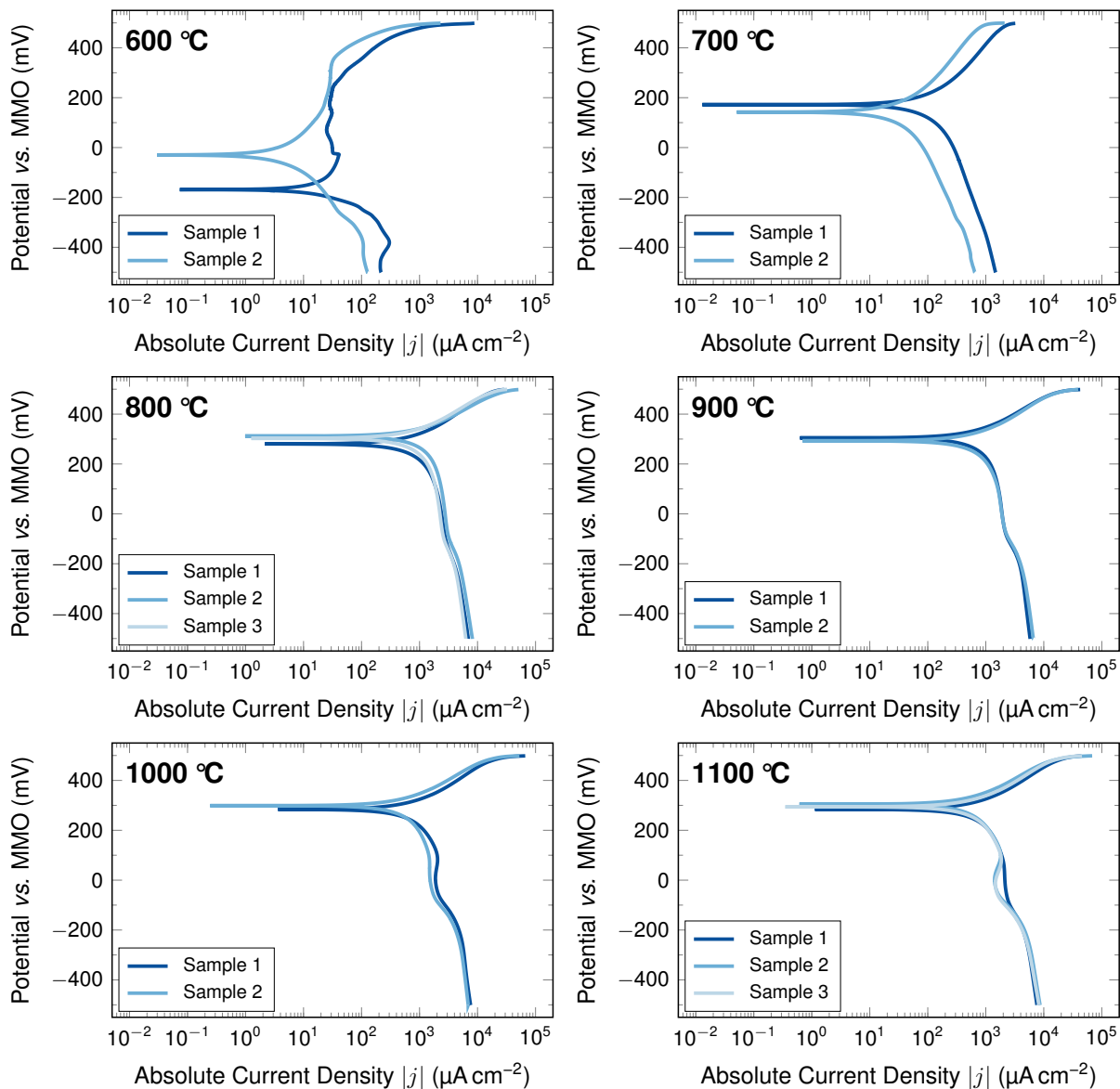


Figure S4: Linear sweep voltammetry ORR measurements for independent samples spun with 1.0 wt % cobalt, carbonised at the indicated temperatures.

3.2 Samples without cobalt

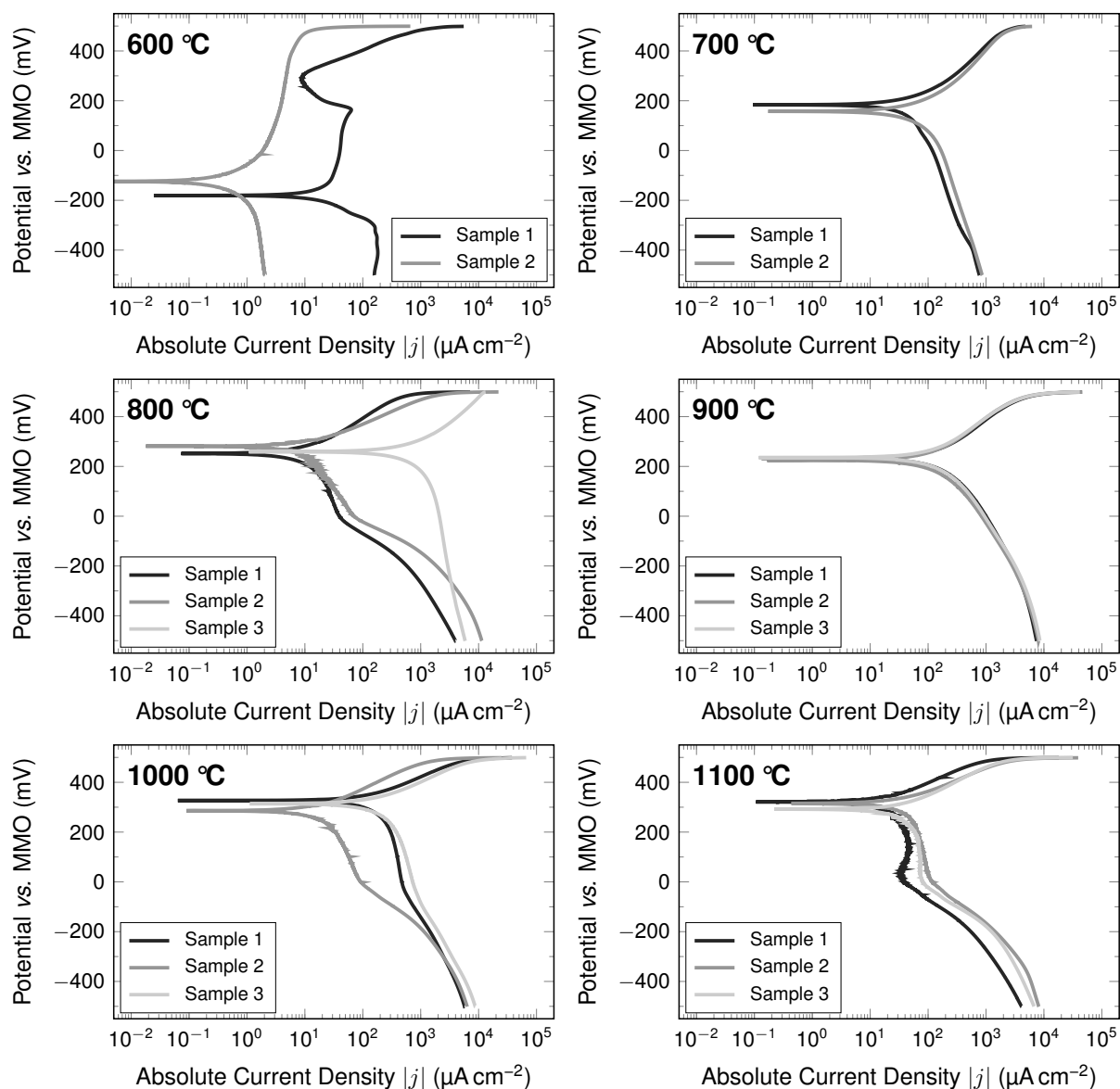


Figure S5: Linear sweep voltammetry ORR measurements for samples spun without additives, carbonised at the indicated temperatures.