

SUPPORTING INFORMATION

Deconvolution of Utilization, Site Density, and Turn-Over-Frequency of Fe-Nitrogen-Carbon ORR Catalysts Prepared with Secondary N-Precursors:

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Table S1. Physical and Chemical Characterization

Catalyst	Microporous Area / m ² g ⁻¹	Mesoporous Area / m ² g ⁻¹	Total DFT Area / m ² g ⁻¹	BET Surface Area / m ² g ⁻¹	Iron Content (ICP) / wt %	Nitrogen Content (EA) / wt %	Sulfur Content (EA) / wt %
Support (Pretreated)	301	296	597	602	0.00 ± 0.05		
PANI (after 3AW/4HT)	536	159	695	622	1.17 ± 0.06	4.1	2.0
PANI-NCB (after 3AW/4HT)	422	97	519	442	2.83 ± 0.16	4.2	4.1
PANI-Urea (after 2AW/3HT)	581	229	810	819	1.22 ± 0.06	4.3	2.3
PANI-Mel (after 2AW/3HT)	759	181	940	869	2.22 ± 0.13	4.4	0.7
PANI-CM (after 2AW/3HT)	518	142	660	634	1.31 ± 0.05	4.7	2.2

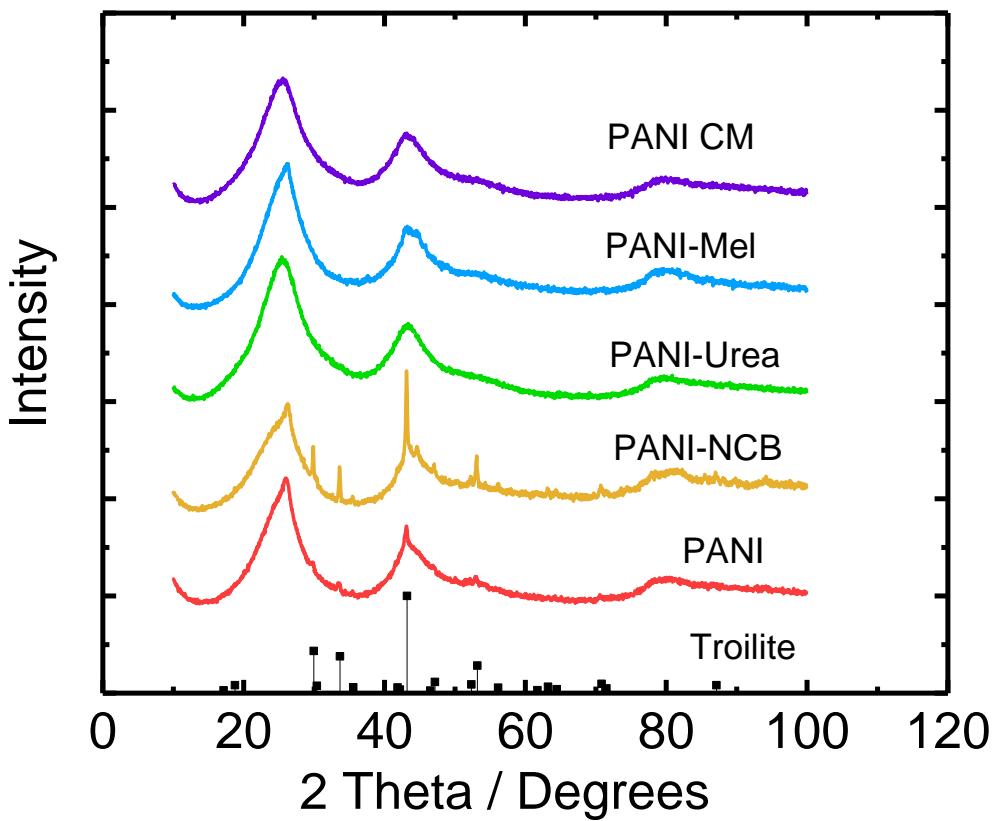


Figure S1. Powder X-ray diffraction of the non-precious ORR electrocatalysts. At bottom, data base diffraction pattern of troilite is shown, from Skala et al.¹

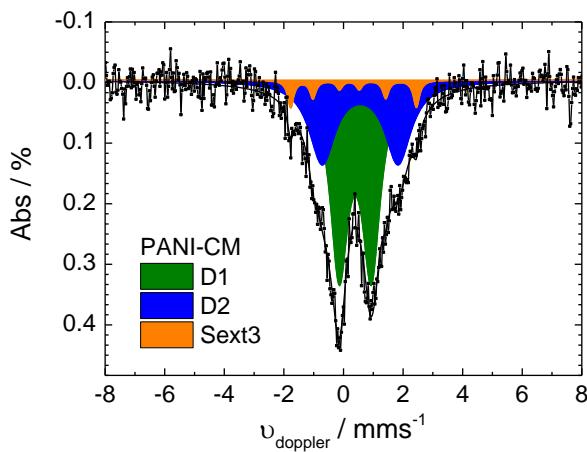
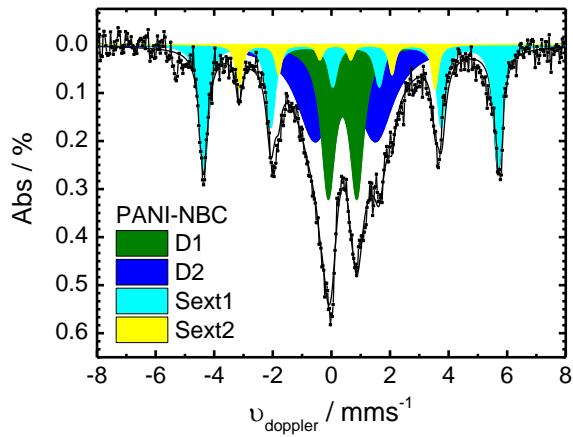
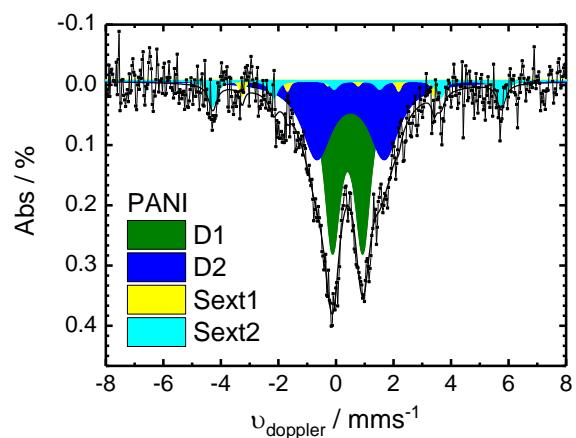


Figure S2: Raw and deconvoluted Mößbauer spectra of PANI, PANI-NBC and PANI-CM catalysts. The spectra of the other two catalyst are given in the main manuscript.

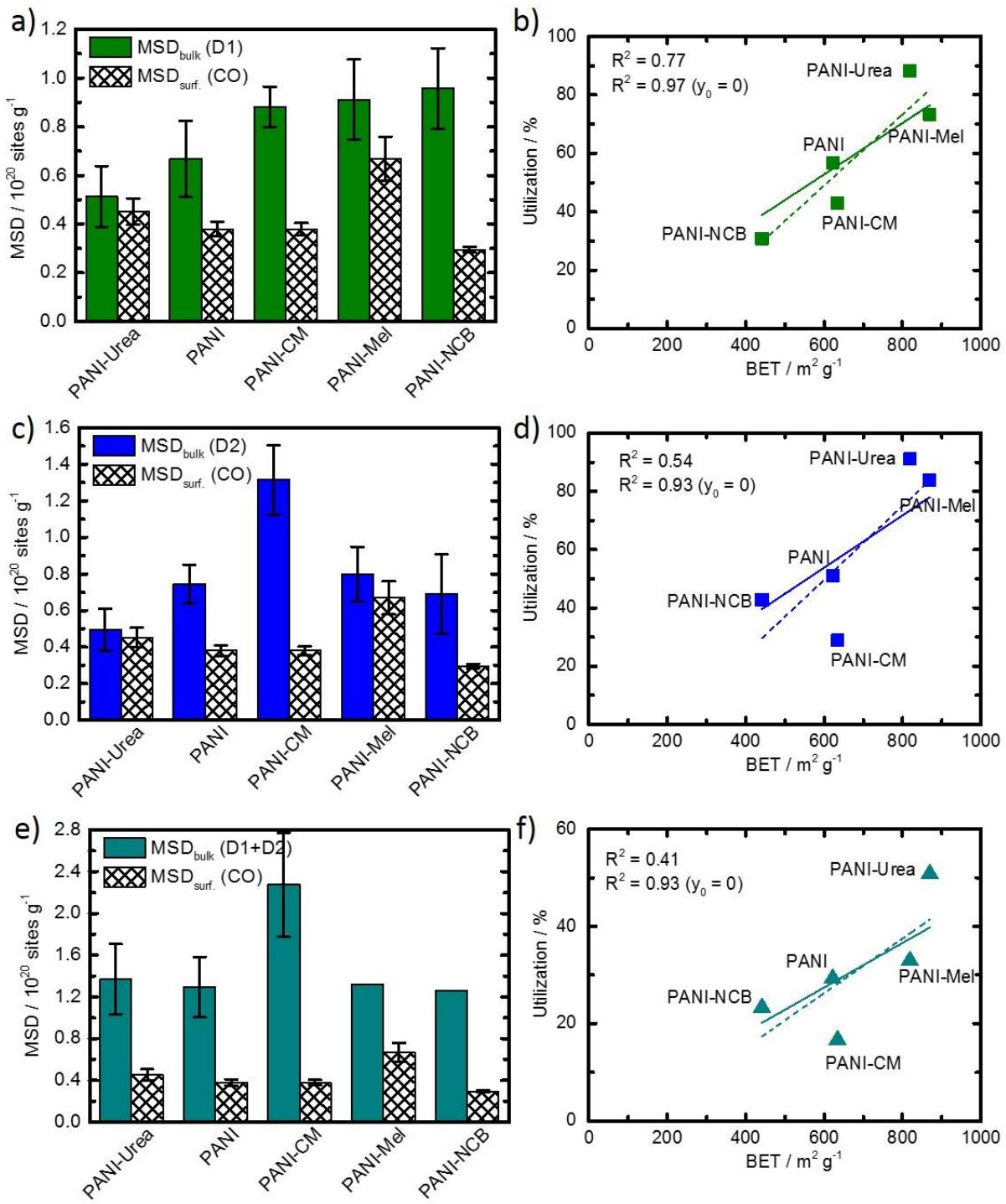


Figure S3. Comparison of mass-based site densities and corresponding plots of utilization versus BET surface area for FeN_4 sites assigned to D1 (a, b), D2 (c, d) or the sum D1+D2 (e, f).

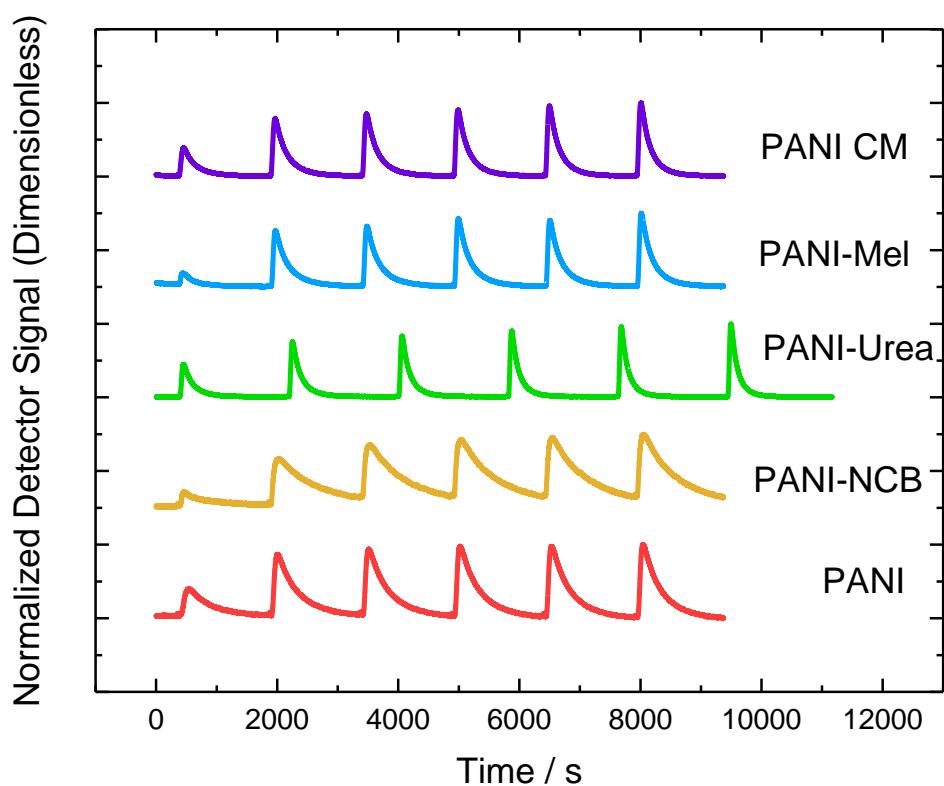


Figure S4. CO-adsorption data measured at 193 K of six pulses of 0.338 ml CO in a helium stream.

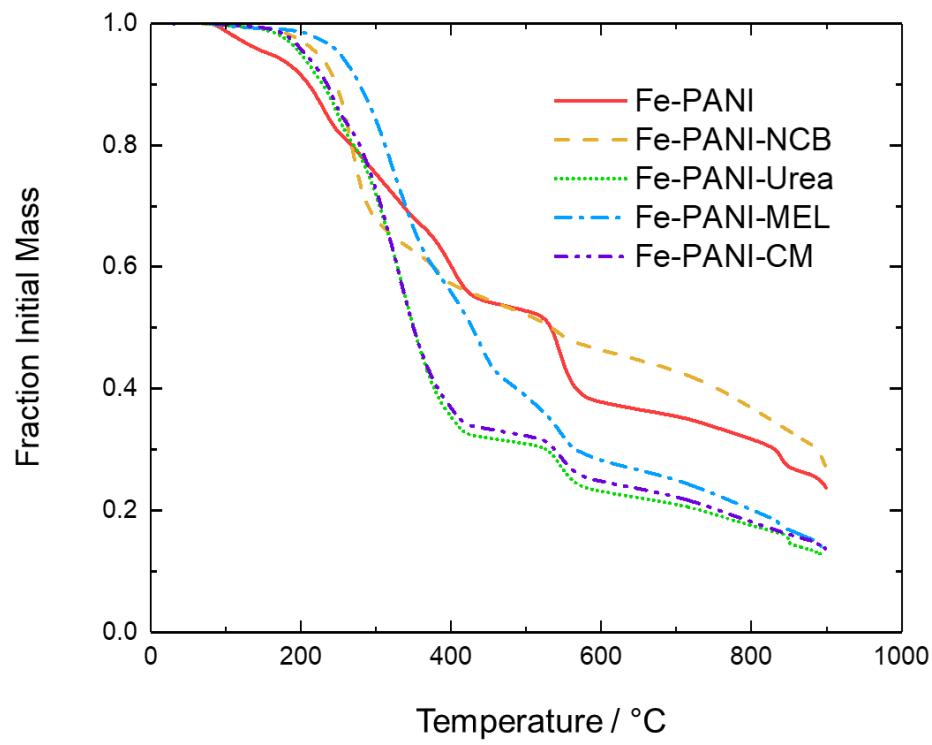


Figure S5. Thermogravimetric data of precursors acquired in temperature range from 30 °C to 900 °C under nitrogen gas flow.

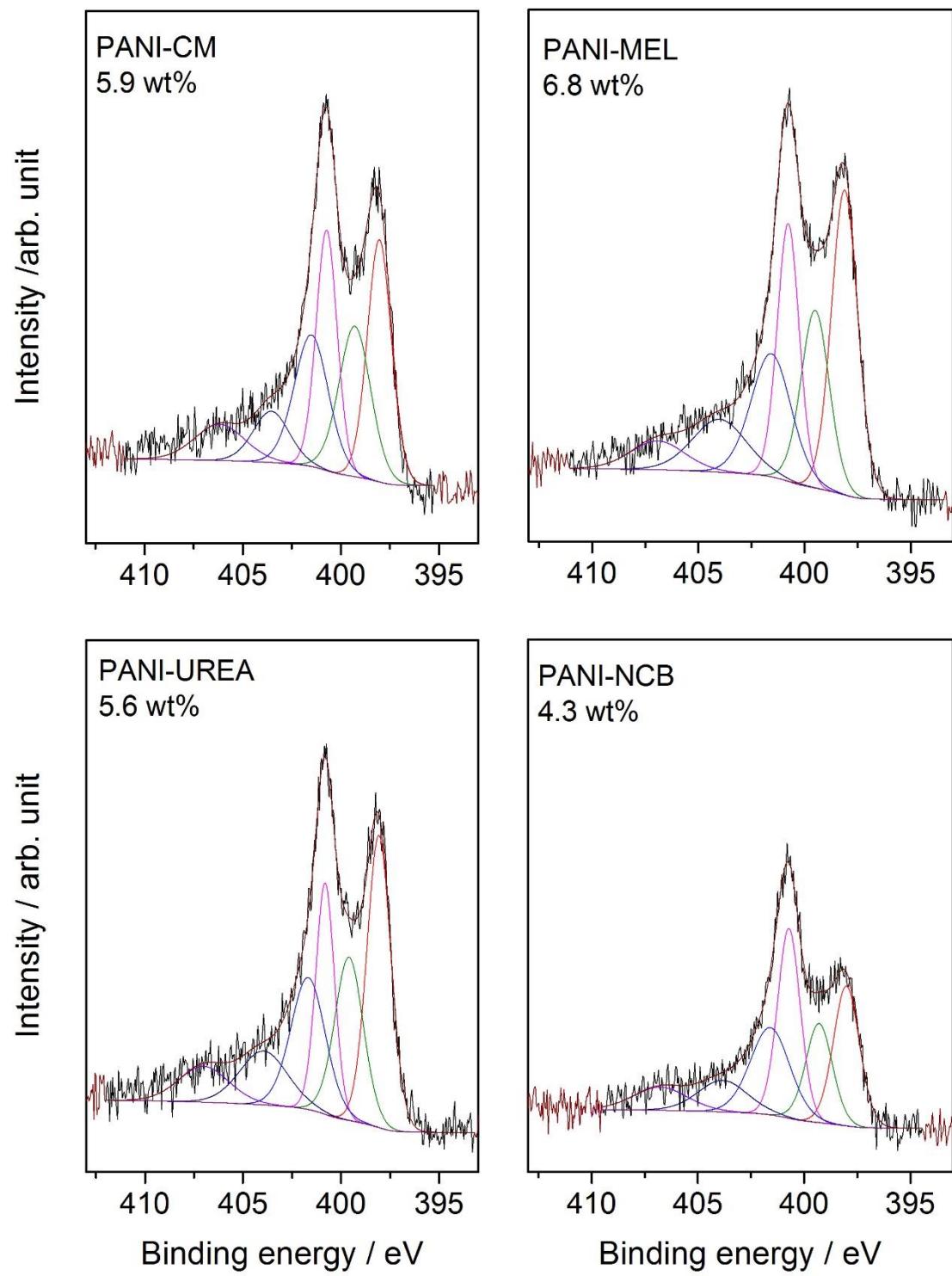


Figure S6. N1s fine scans including the convolution into nitrogen functionalities. As inserts the catalyst names and nitrogen content determined from XPS are given.

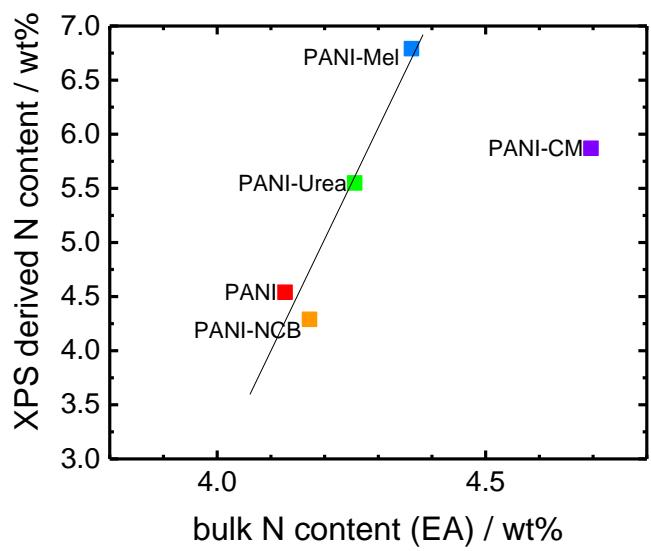


Figure S7. Comparison of bulk and “surface related” (XPS) N contents of all investigated catalysts.

References

1. Skala, R.; Cisarova, I.; Drabek, M., Inversion twinning in troilite. *Am Mineral* **2006**, *91* (5-6), 917-921.