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Supporting Information for

Beyond Conventional Electrocatalysts: Hollow Nanoparticles for Improved and Sustainable Oxygen Reduction Reaction Activity

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References

EXAFS Measurements Performed on the Pt-Ni/C and the Pt-Ni/C-AT Catalysts

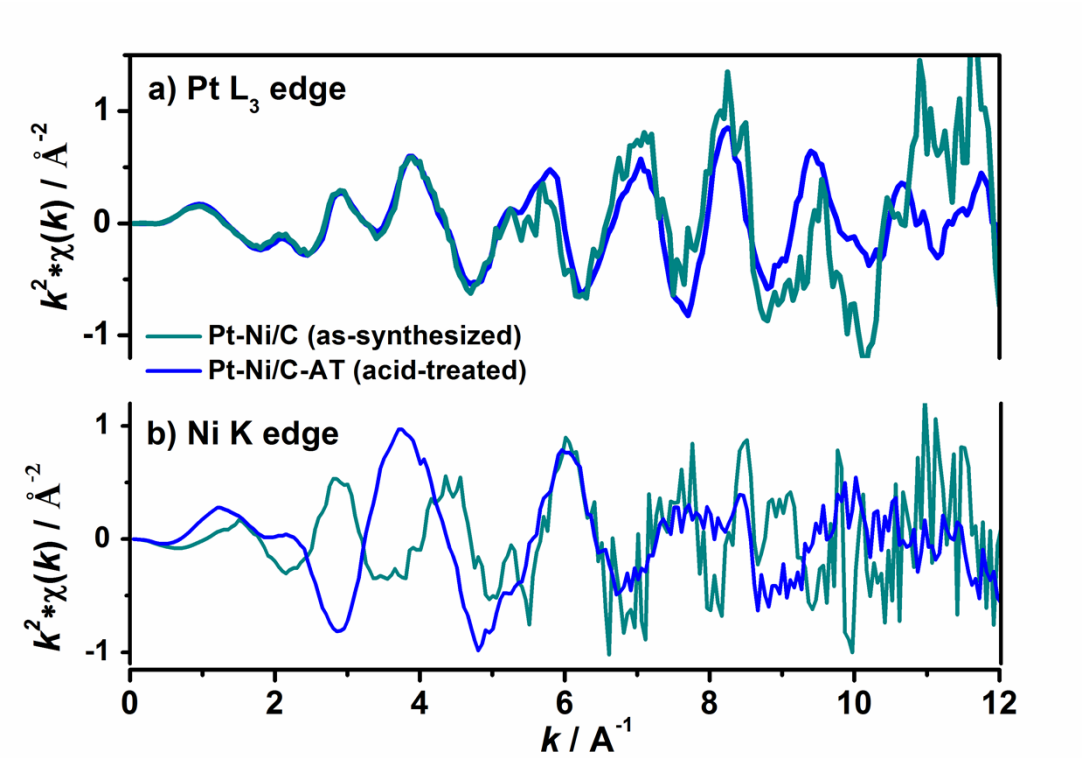

Figure S1. k^2 weighted EXAFS spectra measured at the (A) Pt L_3 and (B) the Ni K edges on the Pt-Ni/C (blue) and the Pt-Ni/C-AT (dark cyan lines) catalysts.

EXAFS Measurements Performed on the Pt-Ni/C and the Pt-Ni/C-AT Catalysts

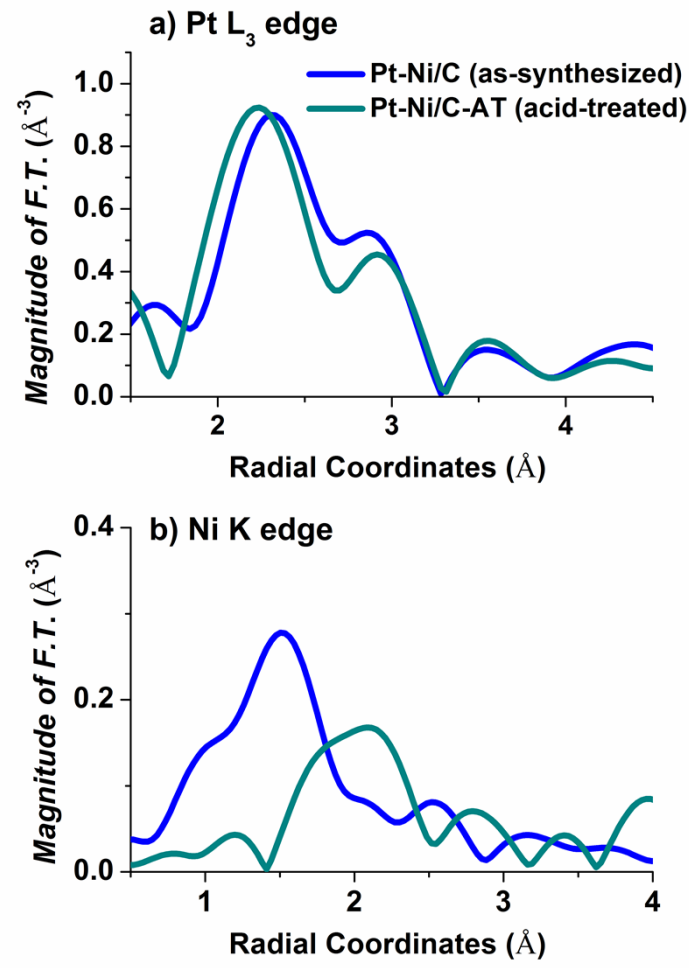

Figure S2. Fourier transform (FT) magnitudes of the $k^2\chi$ (k) EXAFS spectra measured at the a) Pt L_3 and b) Ni K edges for the Pt-Ni/C (blue) and the Pt-Ni/C-AT (dark cyan lines) catalysts.

Representative EEL Spectra Measured in the Core/Shell Areas of a Hollow Pt-Ni/C-AT Nanoparticle

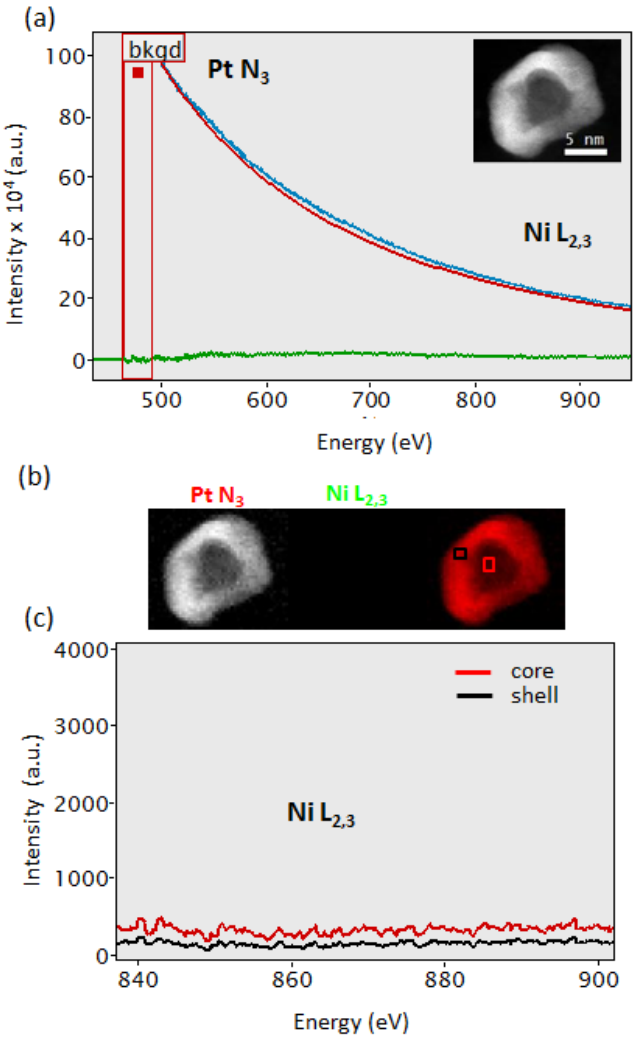

Figure S3. (a) Representative EEL spectra measured on a hollow Pt-Ni/C-AT nanoparticle. The brutto signal is displayed in blue, the background subtraction using a power law function is shown in red and the background-subtracted signal is displayed in green. The inset displays the ADF image of the analyzed Pt-Ni/C-AT nanoparticle. (b) Pt N_3 and Ni $L_{2,3}$ elemental mapping and (c) Background subtracted EEL spectra extracted from the sites marked in black (nanoparticle shell) and red (nanoparticle core) rectangles.

Representative EEL Spectra Measured in the Core/Shell Areas of a Core-Shell Pt-Ni/C-AT Nanoparticle

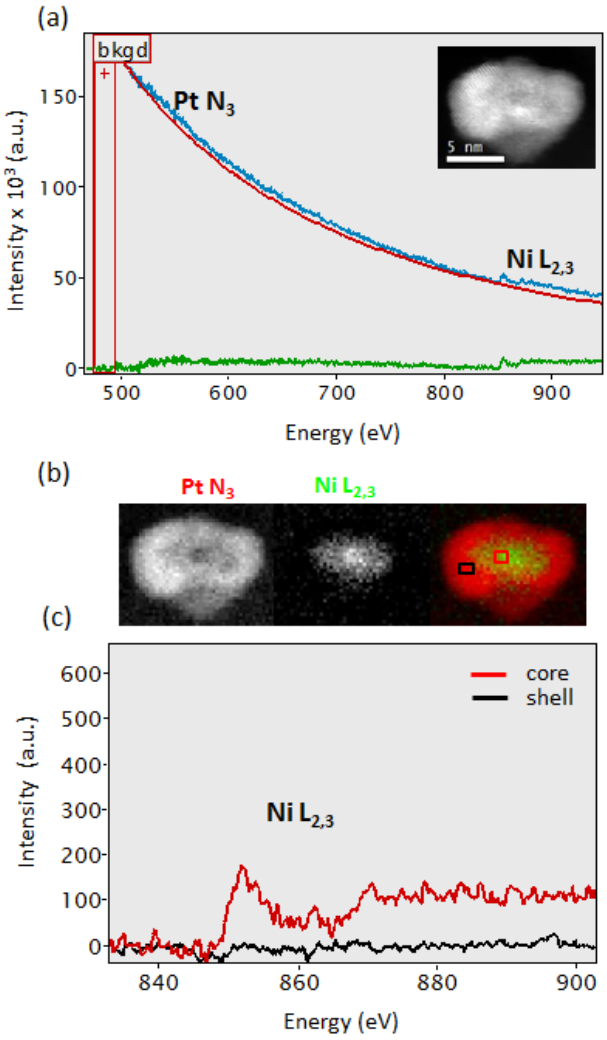

Figure S4. (a) Representative EEL spectra measured on a core-shell Pt-Ni/C-AT nanoparticle. The brutto signal is displayed in blue, the background subtraction using a power law function is shown in red and the background-subtracted signal is displayed in green. The inset displays the ADF image of the analyzed Pt-Ni/C-AT nanoparticle. (b) Pt N_3 and Ni $L_{2,3}$ elemental mapping and (c) Background subtracted EEL spectra extracted from the sites marked in black (nanoparticle shell) and red (nanoparticle core) rectangles.

Table S1. Structural parameters obtained from the best fits of the FTs for the Pt-Ni/C and the Pt-Ni/C-AT electrocatalysts (Pt edge). σ^2 is the mean square radial disorder, and the *R*-factor indicates the quality of the fit from which the data reported in this table are extracted.

Catalyst	Shell	$N_{Pt\text{-}Pt}$	Interatomic distance / nm	σ^2 (x 10^5) / nm^2	E_0 / eV (ΔE_0)	*R*-factor
Pt-Ni/C	Pt-Pt	7.5 ± 0.7	0.273 ± 0.001	4.5 ± 0.1	6 ± 3	0.03
Pt-Ni/C-AT	Pt-Pt	7.5 ± 3.5	0.273 ± 0.001	3.8 ± 5	6 ± 1	0.02