Bifunctional PGM-free electrocatalysts for seawater batteries

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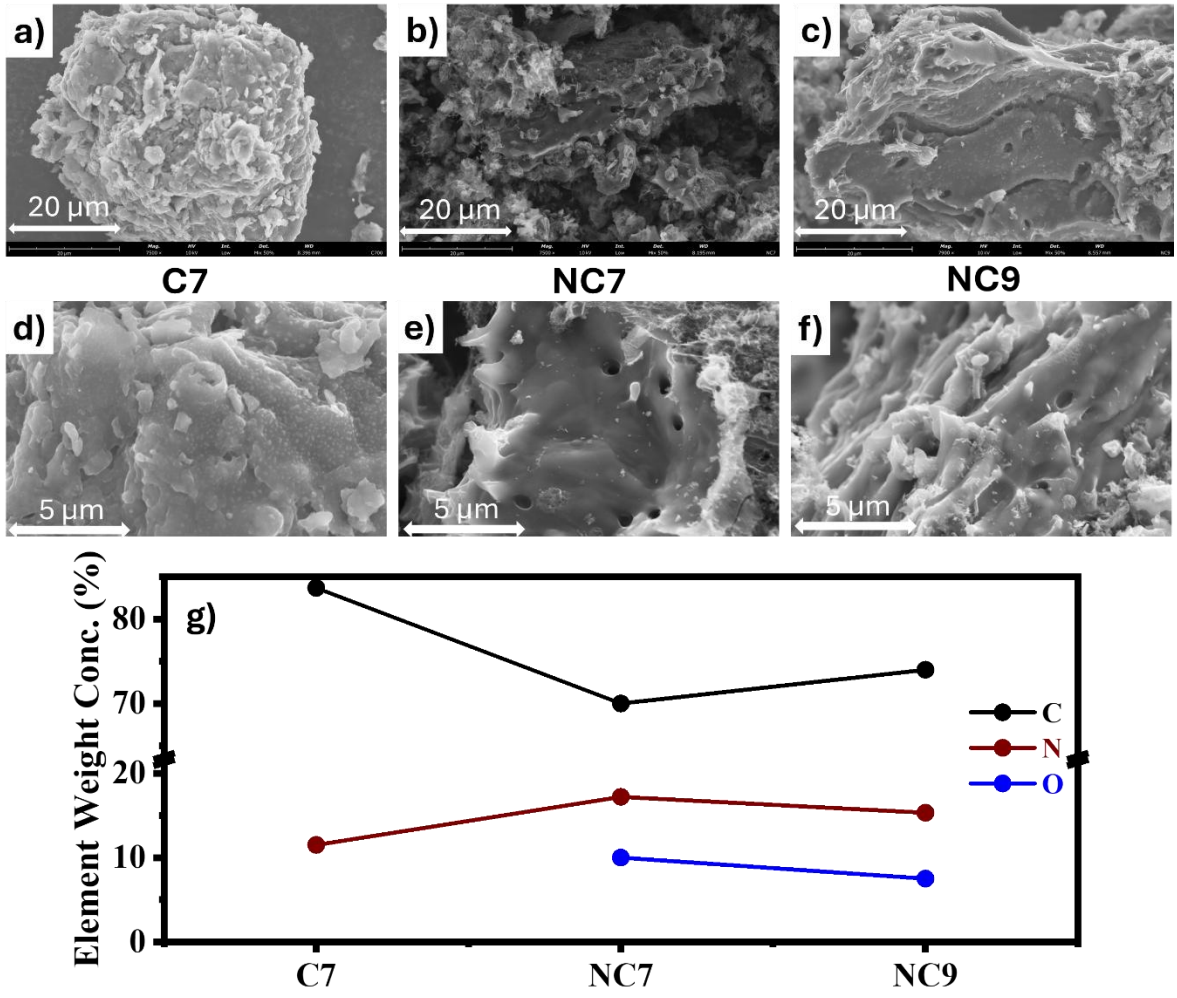

Figure S1. SEM images of C7 (prepared without urea at 700 °C), NC7, and NC9 (prepared with urea at 700 and 900 °C, respectively) and trends of key element concentrations.

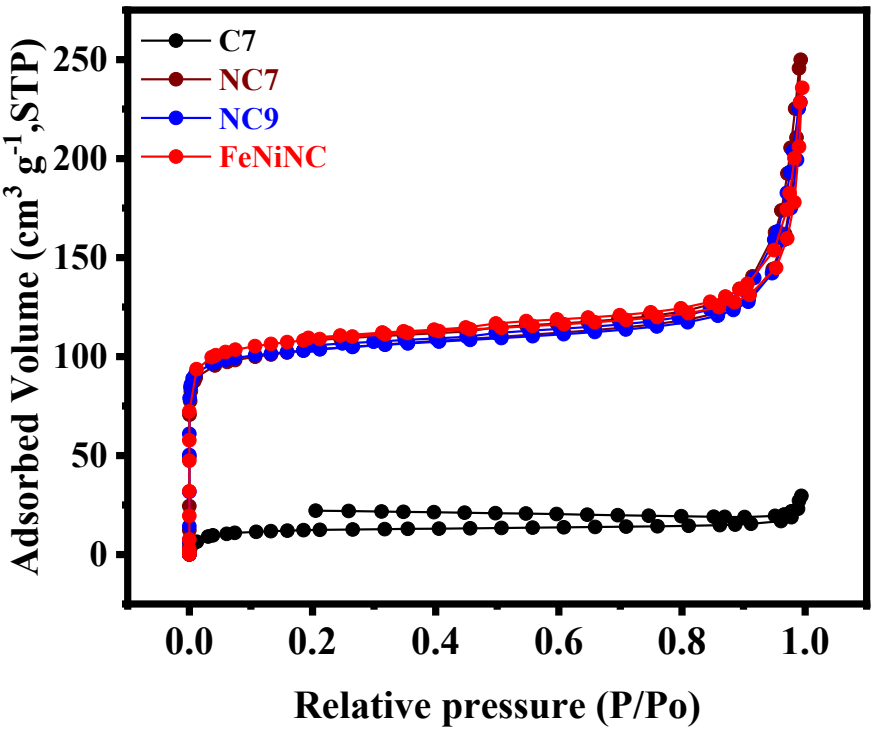

Figure S2. N_2 adsorption/desorption isotherm of C7 (black), NC7 (wine red), NC9 (blue), and FeNiNC (red).

Table S1. Summary of surface area and pore volume by BET characterization.

Samples	Surface Area (S_{BET}) $m^2 g^{-1}$	Pore Volume (mesoporous) $cm^3 g^{-1}$
C7	46.96	4.38
NC7	397.93	36.3
NC9	405.37	33.9
FeNiNC	419.44	32.4

Table S2. Weight percent concentration of main elements of hazelnuts, NC7 and FeNiNC samples.

Elements	Hazelnuts	NC7	FeNiNC
C	53.2	70.0	73.0
O	44.7	10.0	17.0
N		17.2	7.3
K	2.1	2.8	1.0
Fe			0.6
Ni			1.1

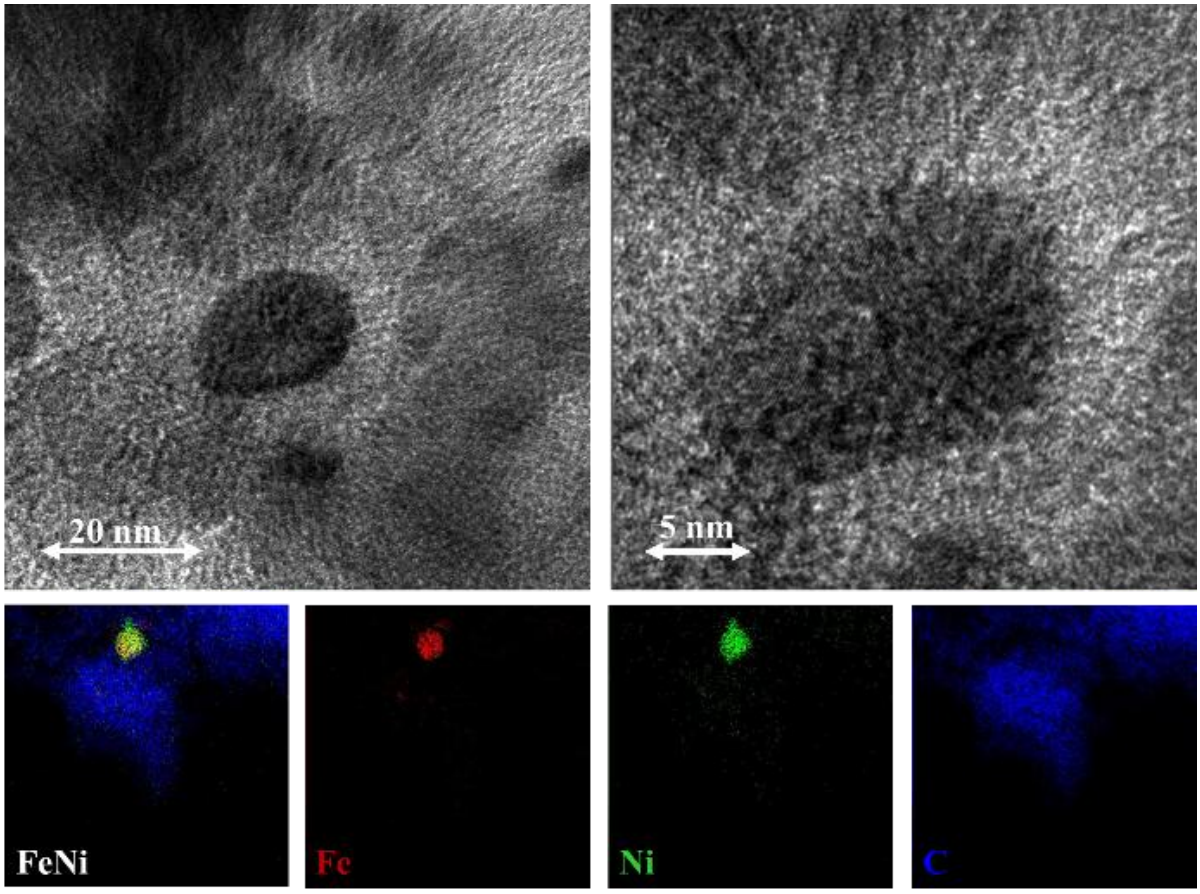

Figure S3. HR-TEM and EDX images of FeNiNC catalyst.

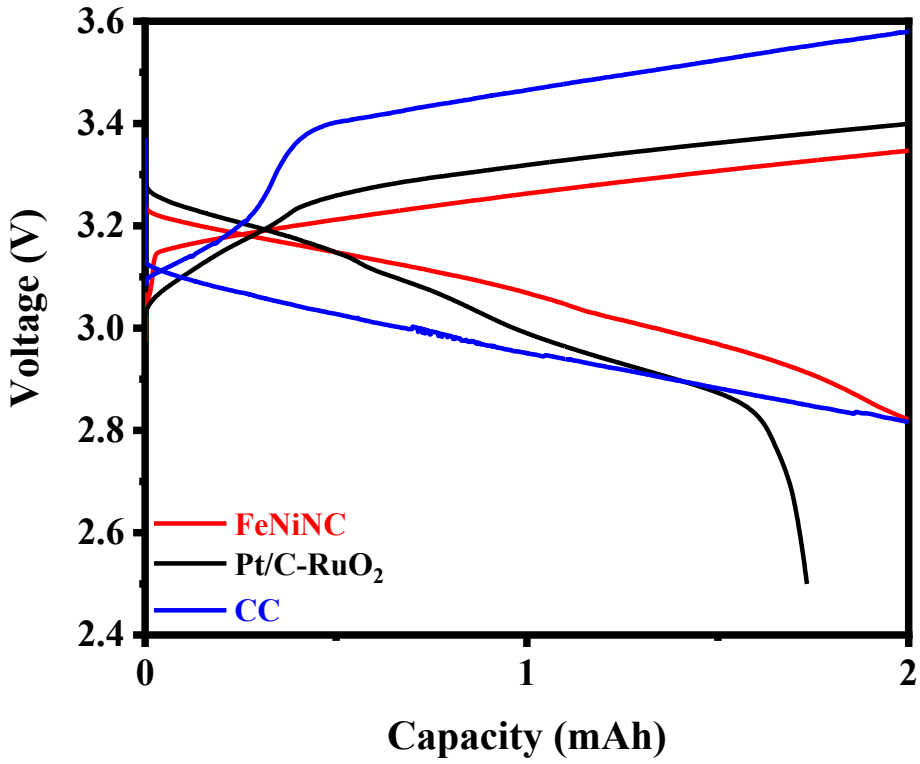

Figure S4. Galvanostatic charge-discharge profile of the 1st cycles for SWBs with bare carbon cloth (CC) as cathode to compare with those containing FeNiNC and Pt/C-RuO_2 catalysts.