

SUPPORTING INFORMATION

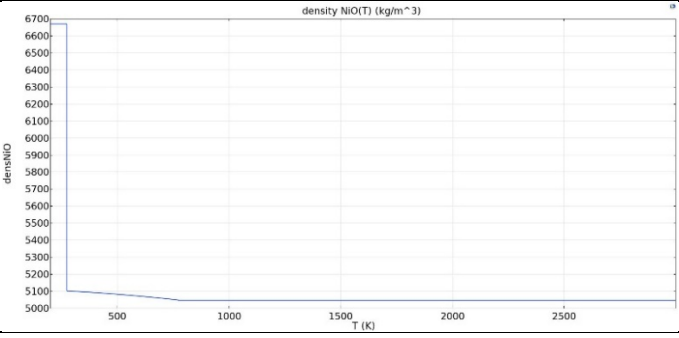
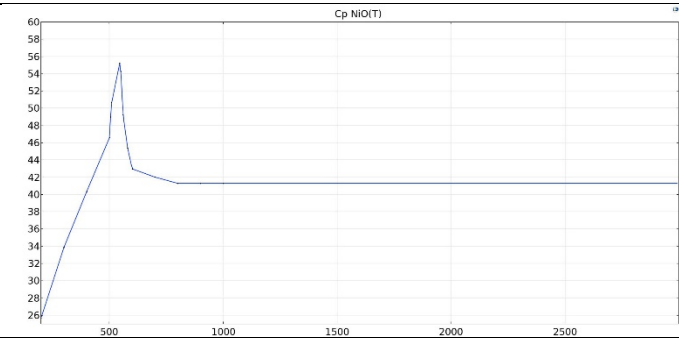
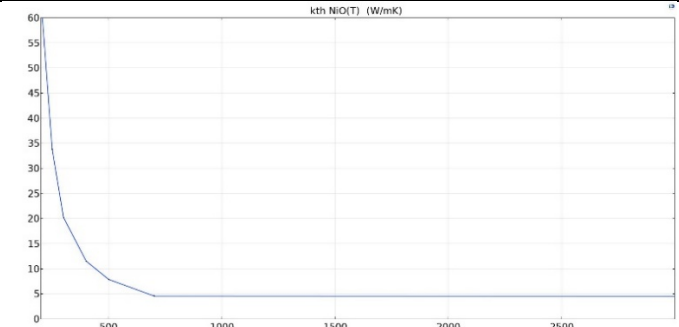
	Water	Carbon	NiO
α (1/m)	0	5×10^4	5×10^5
R (%)	0	8	10
T_{trans} (K)	220	4800	2228
ρ_s (kg/m ³)	917	2100	
ρ_v (kg/m ³)	1	--	
L (J/kg)	2.83 (sublim.)	--	--
$C_{p,s}$ (J/kgK)	1400	700	
$C_{p,v}$ (J/kgK)	2000	--	
$K_{\text{th},s}$ (W/mK)	3.5	0.53	
$K_{\text{th},v}$ (W/mK)	0.3	--	

Table S1. Parameters used in the photothermal simulations: light absorption coefficient (α); reflection coefficient (R); phase transition temperature (T_{trans}); solid and vapour densities (ρ_s , ρ_v); latent heat (L); specific heat (C_p); and thermal conductivity (k_{th}).

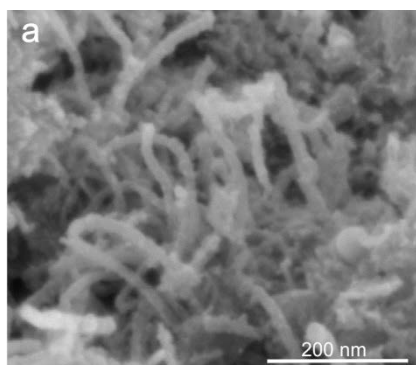


Figure S1. XHRSEM image of the (5/1/5)U sample.

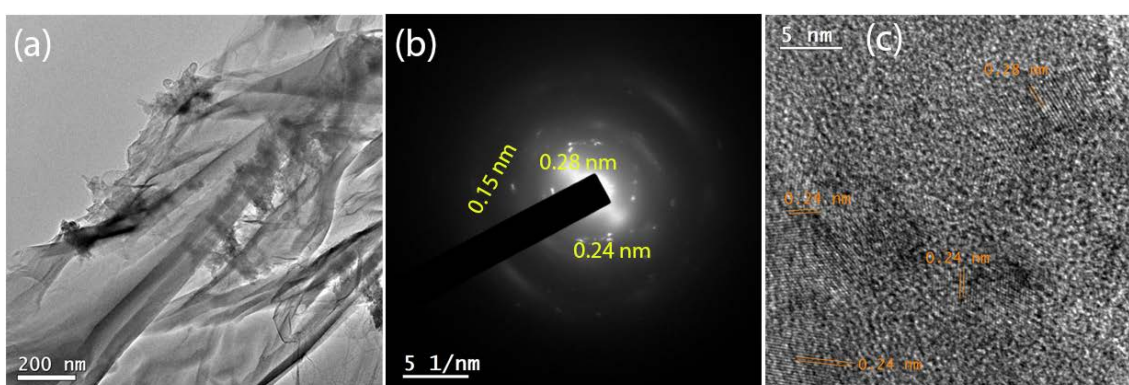


Figure S2. (a) TEM images of GO raw material (b) SAED pattern of the imaged region and (c) HRTEM image revealing the crystalline nature of GO.

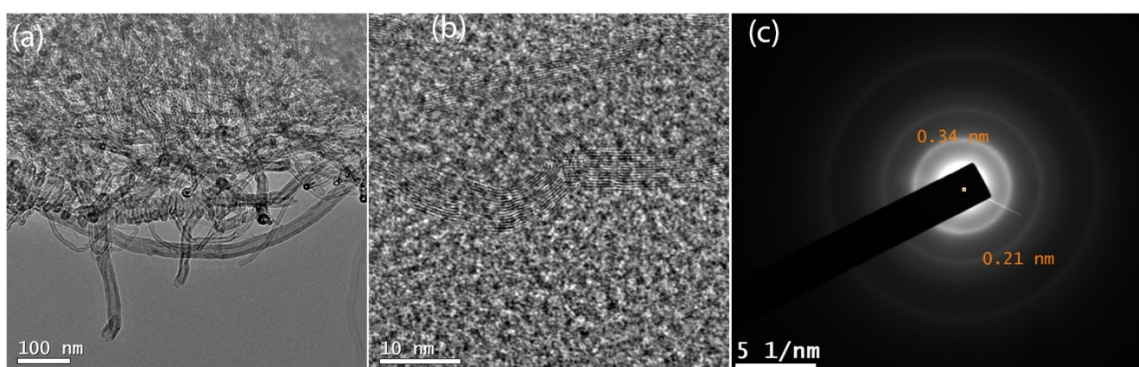


Figure S3. (a) TEM image of raw MWCNTs (b) HRTEM image showing 15 concentric layers of a MWCNT, without significant structural defects (c) SAED pattern of the imaged region shown in (a) confirms the graphitic crystallographic structure.

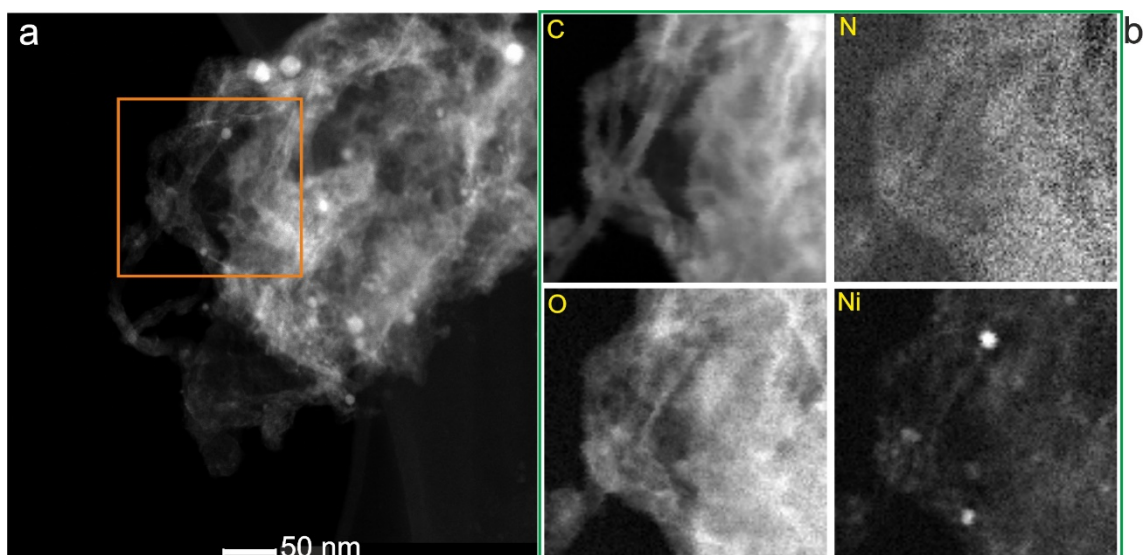


Figure S4. Representative EELS composition maps of the sample (5/1/5)U. (a) STEM image with the indicated region chosen for the composition analysis. (b) Carbon, nitrogen, oxygen and nickel maps.

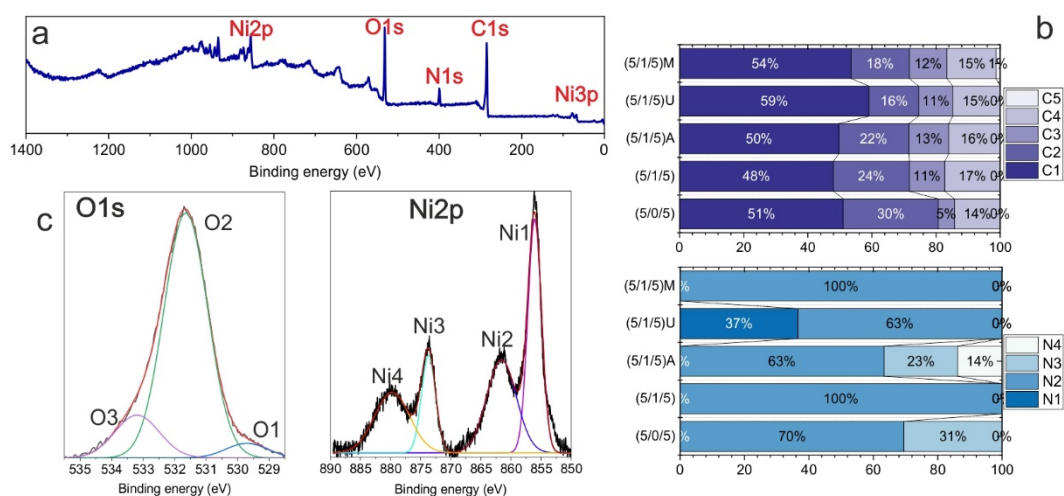


Figure S5. (a) XPS survey of the (5/1/5)U sample showing C1s, O1s, N1s and Ni(2p, 3p) signal as well as additional Auger and energy loss lines (not labelled). (b) Areal percentage of the XPS deconvoluted components of the C1s and N1s peaks. (c) High resolution O1s and Ni2p spectra of the (5/1/5)U sample.

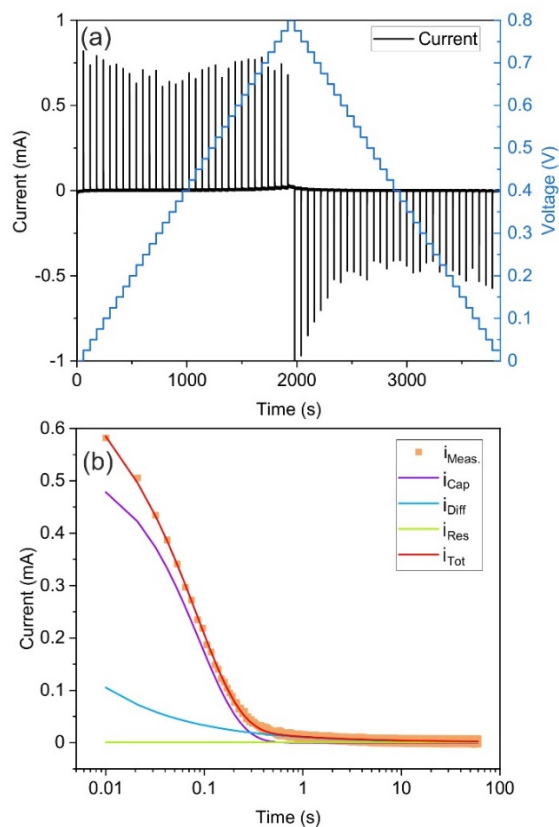


Figure S6. (a) Applied voltage steps and corresponding current evolution with acquisition time in a SPECS experiment. (b) Fitting of a typical current peak measured ($i_{Meas.}$) considering the capacitive (i_{Cap}), diffusional (i_{Diff}), and residual (i_{Res}) components. $i_{Tot} = i_{Cap} + i_{Diff} + i_{Res}$.

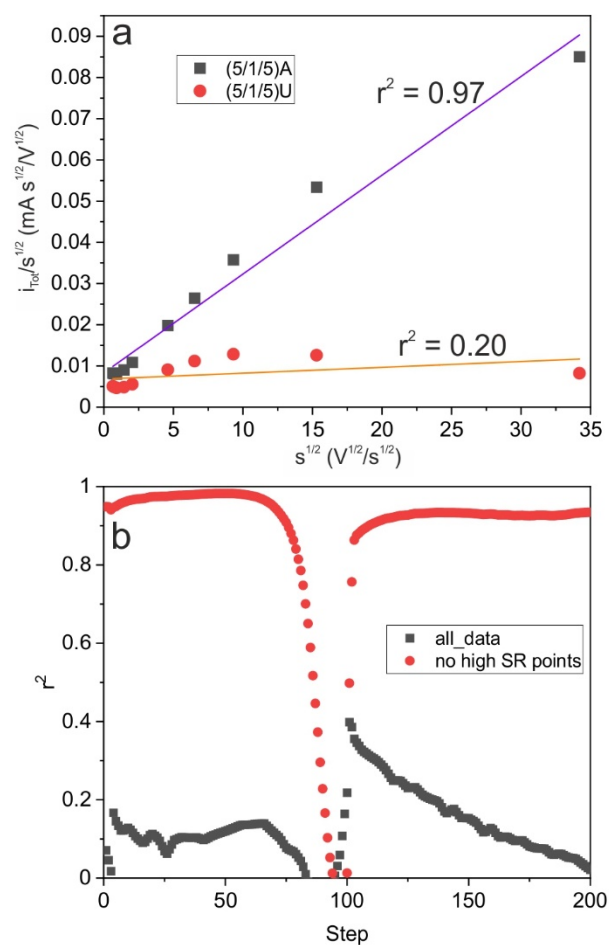


Figure S7. (a) Typical linear fitting of $i_{\text{Tot}}/s^{1/2}$ vs $s^{1/2}$ for (5/1/5)A and (5/1/5)U electrodes. (b) Coefficient of determination (r^2) of the linear fitting as a function of the SPECS step (voltage) for the (5/1/5)U electrode. “All data” refers to the fitting considering all the sweep rate (SR) values. “No high SR points” is the result obtained without considering the two highest SR values.