

Supplementary Materials for

Stacking-faults and moiré superlattice nucleation within the graphitic layers of partially-collapsed carbon nano-onions filled with γ -Fe: the role of indium isopropoxide as growth-promoter

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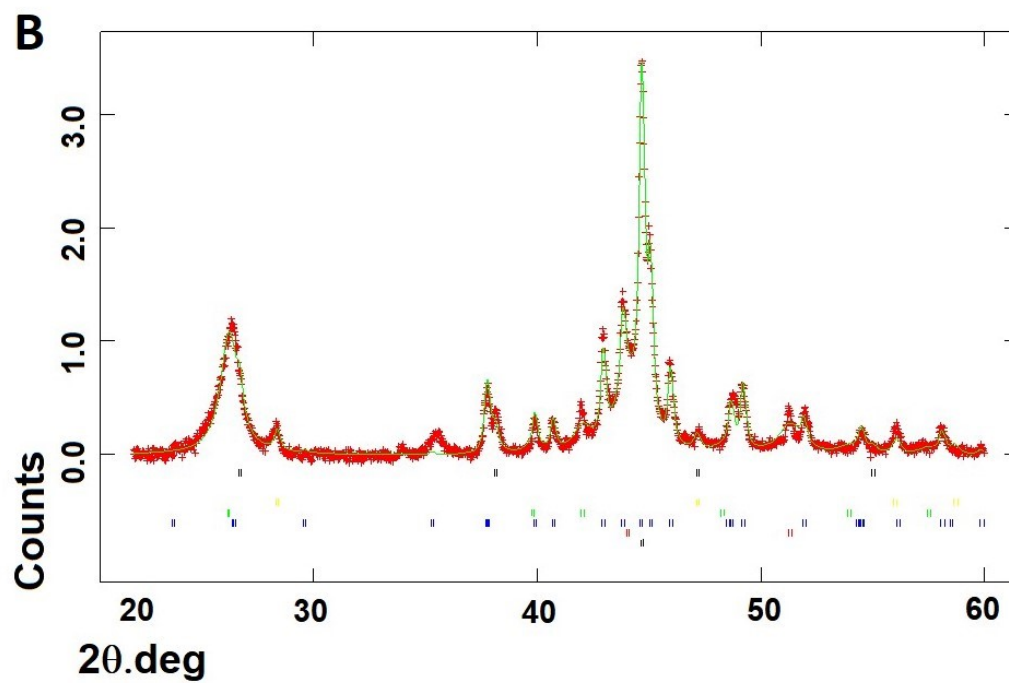
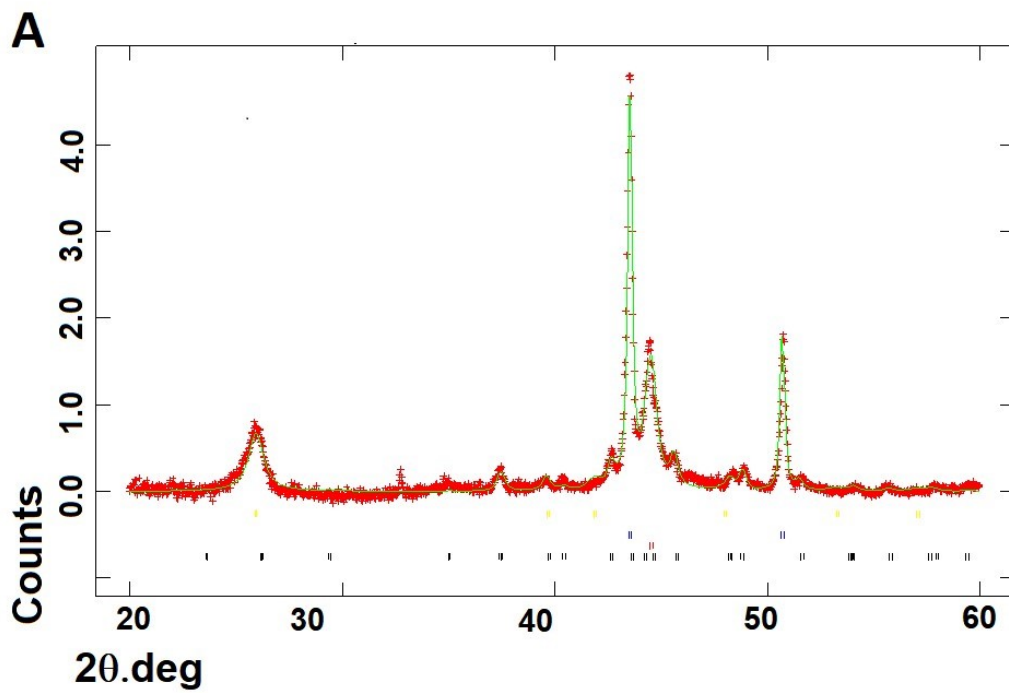


Figure S1: XRD and Rietveld refinement analyses of CNOs films obtained without and with addition of indium-isopropoxide as growth-promoter.

Table 1	Lattice parameter (experiments without indium isopropoxide)						Relative abundance
	a	b	c	α	β	γ	
α -Fe	2.88	2.88	2.88	90°	90°	90°	3.90%
γ -Fe	3.60	3.60	3.60	90°	90°	90°	24.89%
Fe ₃ C	5.11	6.82	4.55	90°	90°	90°	14.64%
Graphite	2.63	2.63	6.88	90°	90°	120°	56.57%

Table 1: List of structural components and corresponding lattice parameters and relative abundances extracted from Rietveld refinement analyses of the diffractograms acquired from CNOs samples fabricated in absence of indium isopropoxide as growth-promoter.

Table 2	Lattice parameters (experiments with indium isopropoxide, 10 mg)						Relative abundance
	a	b	c	α	β	γ	
α -Fe	2.87	2.87	2.87	90°	90°	90°	7.38%
γ -Fe	3.56	3.56	3.56	90°	90°	90°	10.35%
Fe ₃ C	5.09	6.74	4.52	90°	90°	90°	20.88%
Silicon	5.45	5.45	5.45	90°	90°	90°	1.51%
Graphite	2.62	2.62	6.80	90°	90°	120°	58.71%
InC ₃	3.34	3.34	3.34	90°	90°	90°	1.17%

Table 2: List of structural components and corresponding lattice parameters and relative abundances extracted from Rietveld refinement analyses of the diffractograms acquired from CNOs samples fabricated in presence of indium isopropoxide as growth-promoter. The small amount of silicon originates from residual fragments of the substrate-surface, obtained during the process of removal of the sample film (with a spatula).

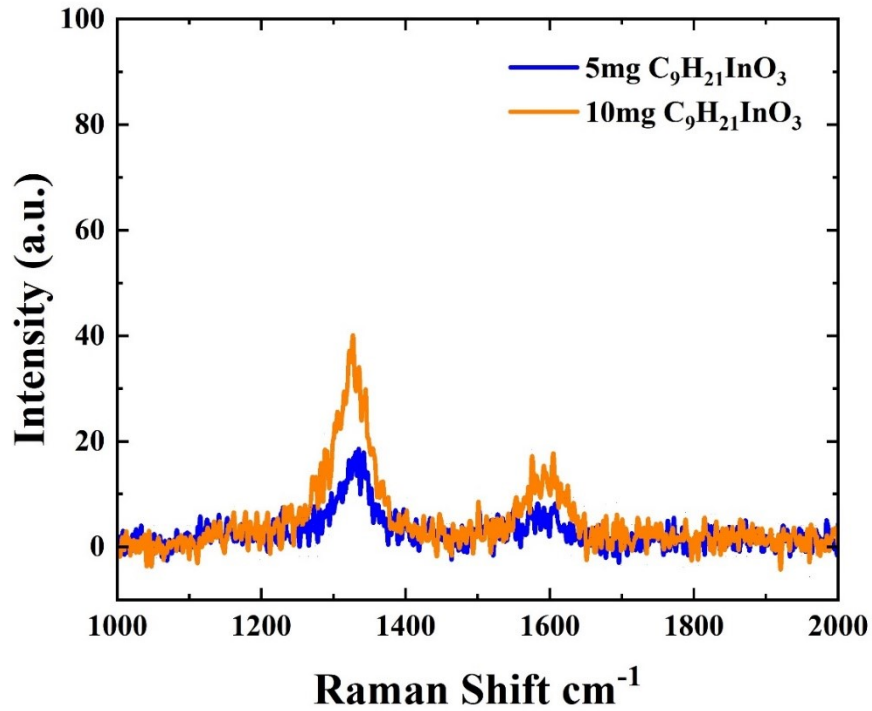


Figure S2: Raman point spectra evidencing typical examples of the enhancement in the D-band intensity with the increase of indium-isopropoxide amount (typical examples acquired from samples obtained in presence of 5 and 10 mg of indium-isopropoxide).

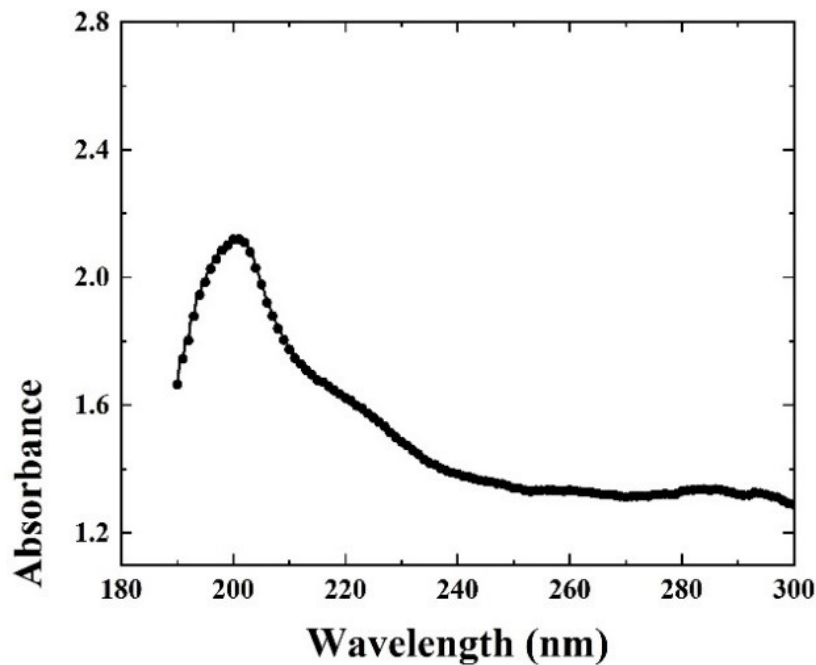


Figure S3: UV absorption spectroscopy acquired from an ensemble of CNOs fabricated in presence of 10 mg of indium isopropoxide. It is noticeable the presence of two absorption components in the range from 190 nm to 240 nm. The observed signal broadening possibly arises from the disorder rich arrangement of the graphitic layers and from C-O contributions which are also observable in the Raman spectroscopy analyses presented in the main manuscript.

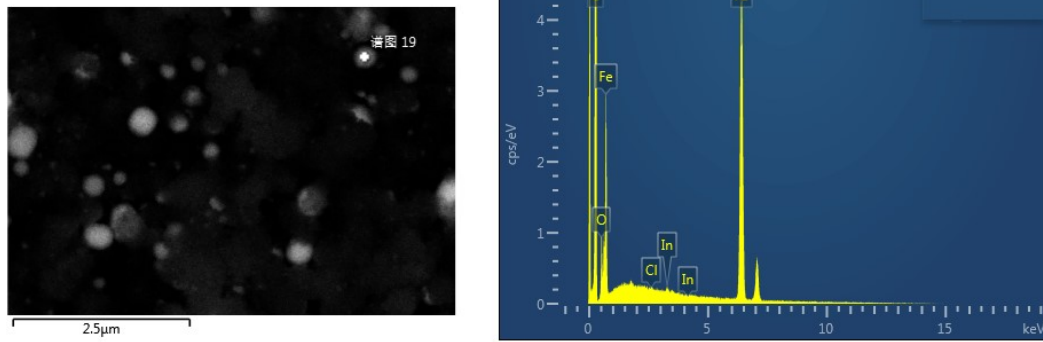


Figure S4: SEM (backscattered electrons) and EDS analyses evidencing the presence of residual quantities of In (in the order of 0.3weight%) in the CNOs produced in presence of 10 mg of indium isopropoxide.

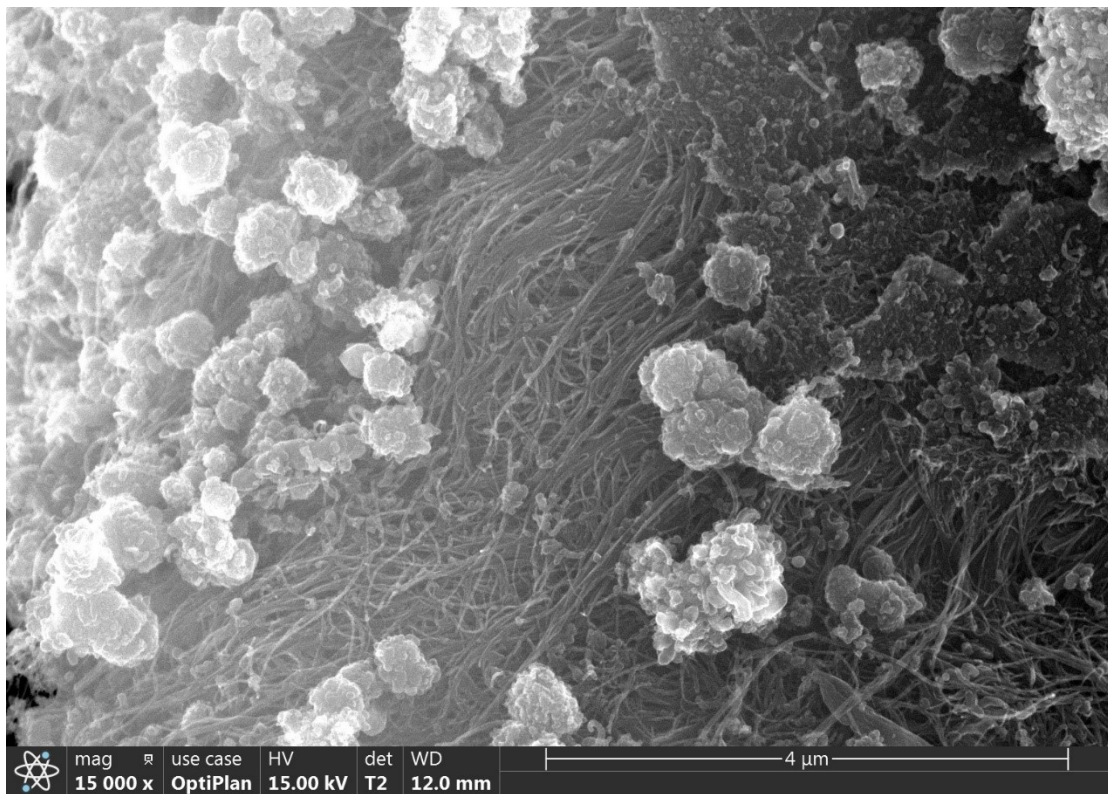


Figure S5: SEM micrograph evidencing the morphological transition of the CNOs into CNTs for quantities of indium isopropoxide of ~ 20 mg.

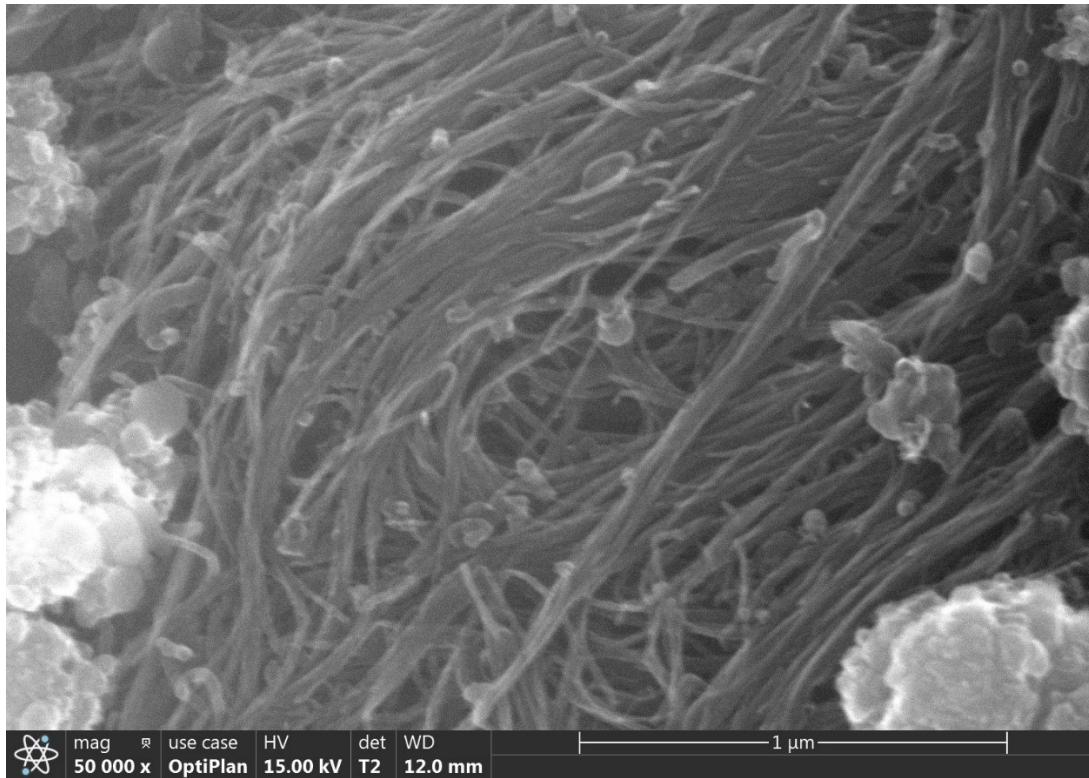


Figure S6: Additional example of SEM micrograph evidencing the morphological transition of the CNOs into CNTs for quantities of indium isopropoxide of ~ 20 mg.

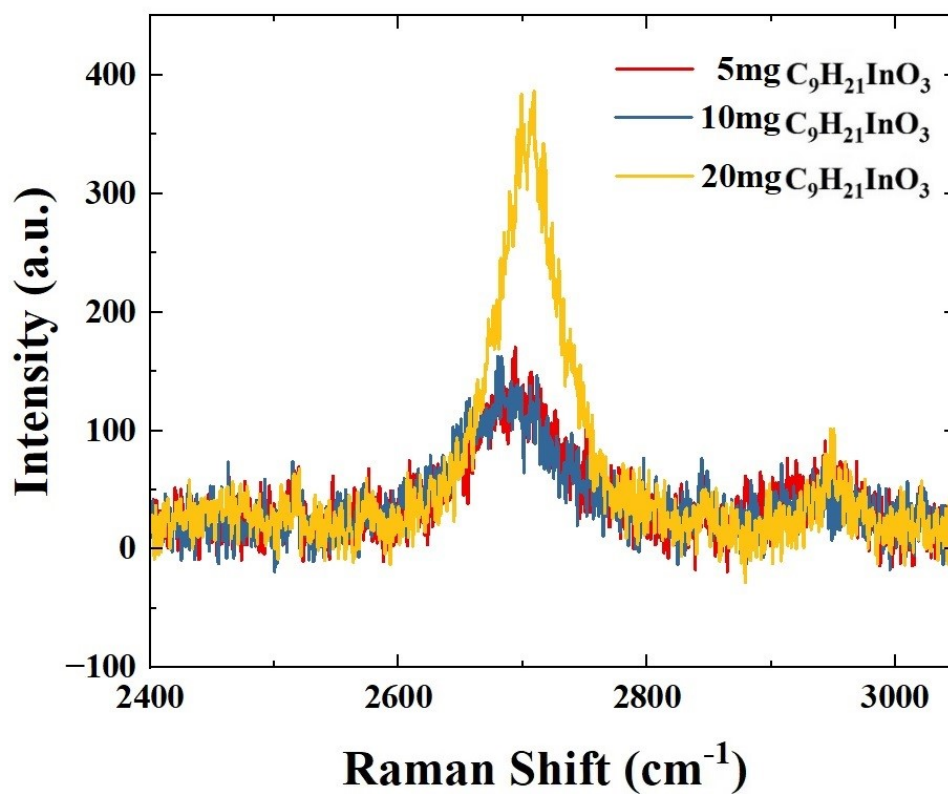


Figure S7: Point Raman spectra plotted as a function of the Indium isopropoxide concentration. Note the significant enhancement of the 2D band intensity for the samples produced in presence of 20 mg of Indium isopropoxide as growth promoter, highlighting a clear transition from CNOs to CNTs.

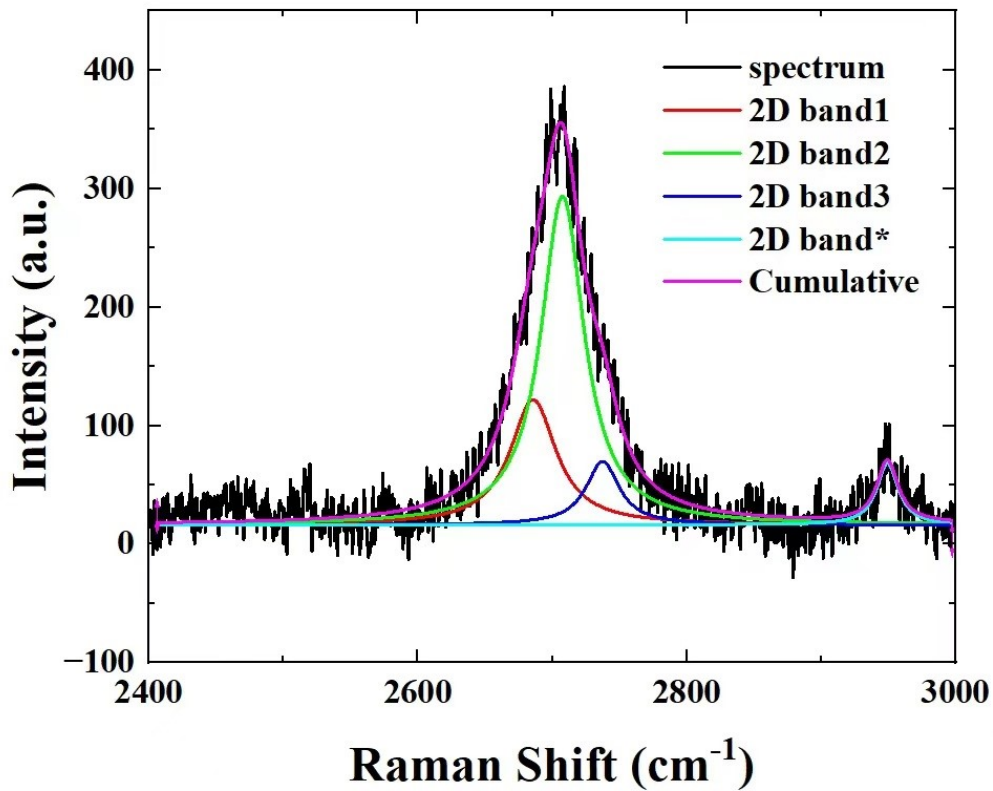


Figure S8: Deconvolution analyses of the 2D band signal, acquired from the CNT-sample obtained when employing 20 mg of Indium isopropoxide. The significant enhancement in the intensity of the 2D band is indicative of a structural transition from CNOs to CNTs.