Supplementary Information

Enhancing EMI shielding of natural rubber-based supercritical CO_2 foams by exploiting porous morphology and CNT segregated network

Yanhu Zhan, [a,b,] Maria Oliviero, [a,] Jian Wang, [c] Andrea Sorrentino, [a] Giovanna G. Buonocore, [a] Luigi Sorrentino, [a] Marino Lavorgna, *[a] Hesheng Xia [c] and Salvatore Iannace [d]

a. Institute of Polymers, Composites and Biomaterials, National Research Council, P.le Fermi, 1-80055 Portici, NA, Italy. E-mail address: mlavorgn@unina.it

b. School of Materials Science and Engineering, Liaocheng University, Liaocheng 252000, China

c. State Key Laboratory of Polymer Materials Engineering, Polymer Research Institute, Sichuan University, Chengdu 610065, China

d. Institute for Macromolecular Studies (ISMAC-CNR) National Research Council, Milano 20133, Italy.

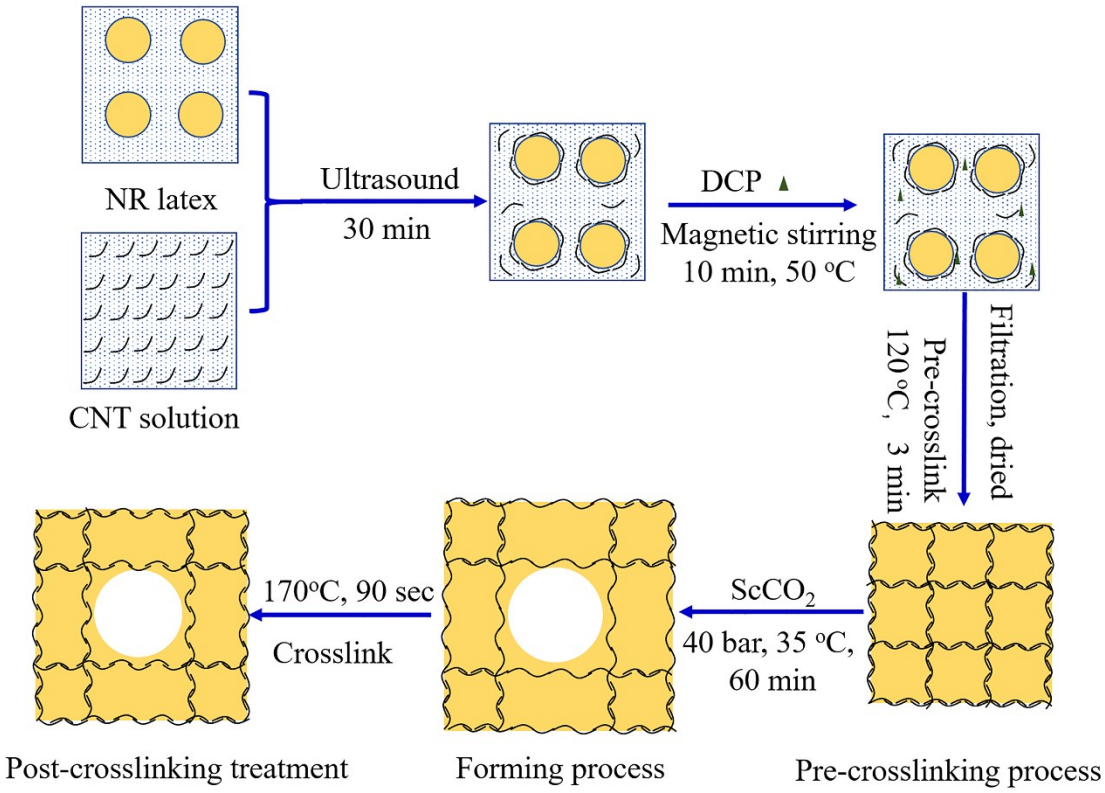

Fig. S1. The preparation of F-NR/CNTs foams by multi-steps method

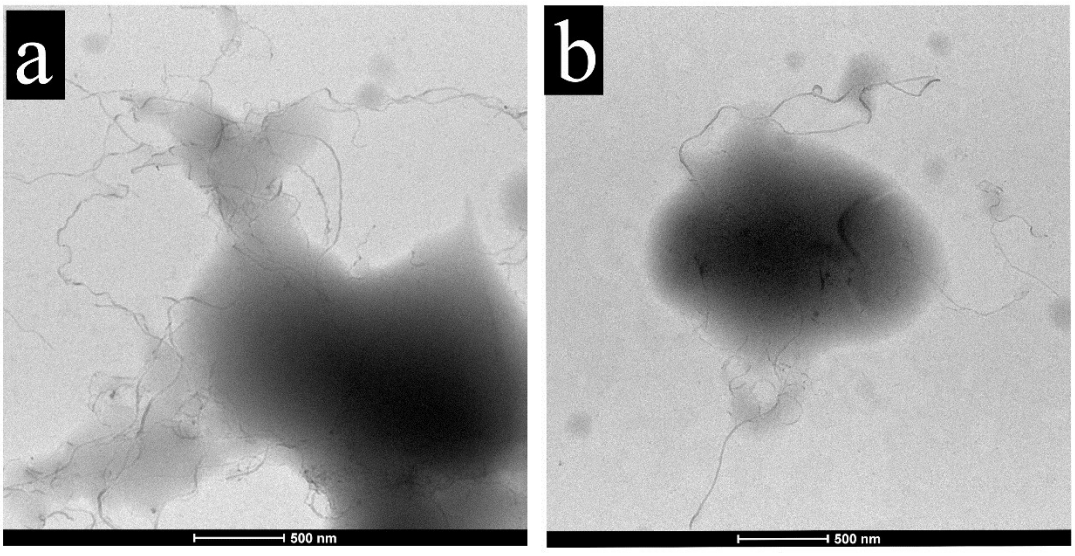

Fig. S2. TEM images of NR latex particles coated with 3.31wt% CNTs

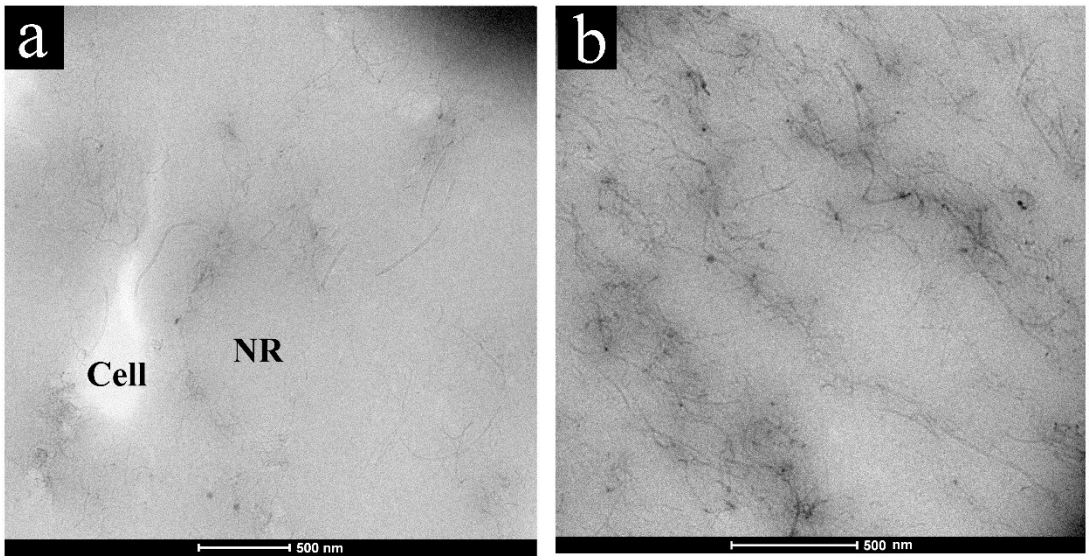

Fig. S3. TEM images of F-NR/$CNT_{1.68}$ (a) and F-NR/$CNT_{6.40}$ (b)

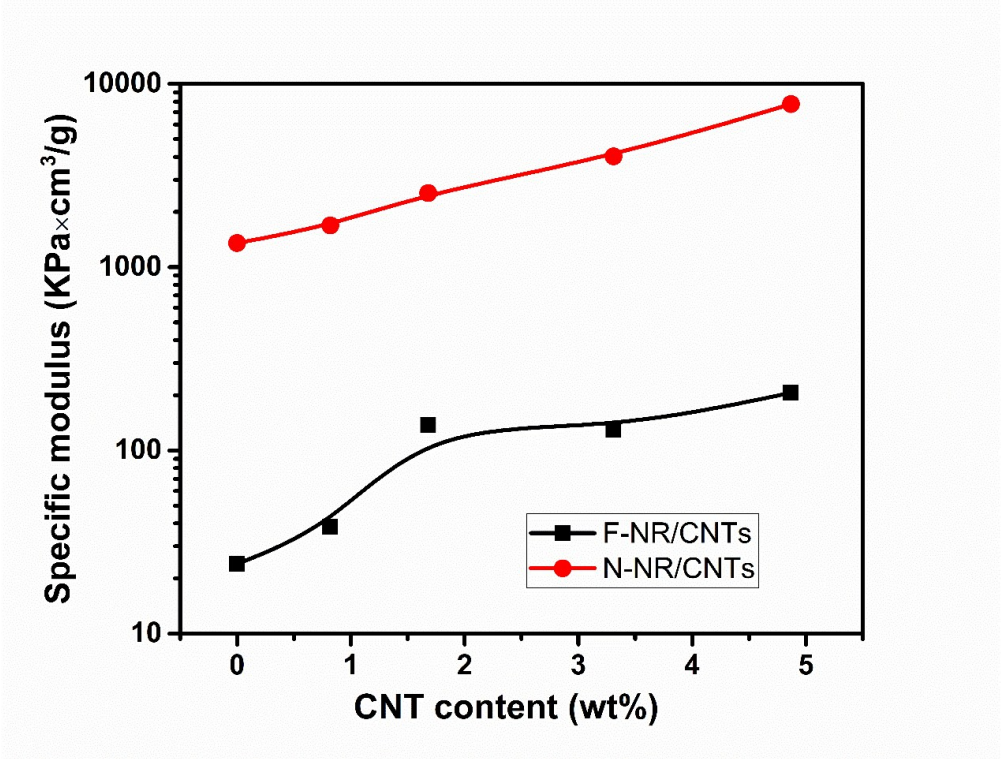

Fig. S4. Specific modulus of N-NR/CNTs and F-NR/CNTs composites

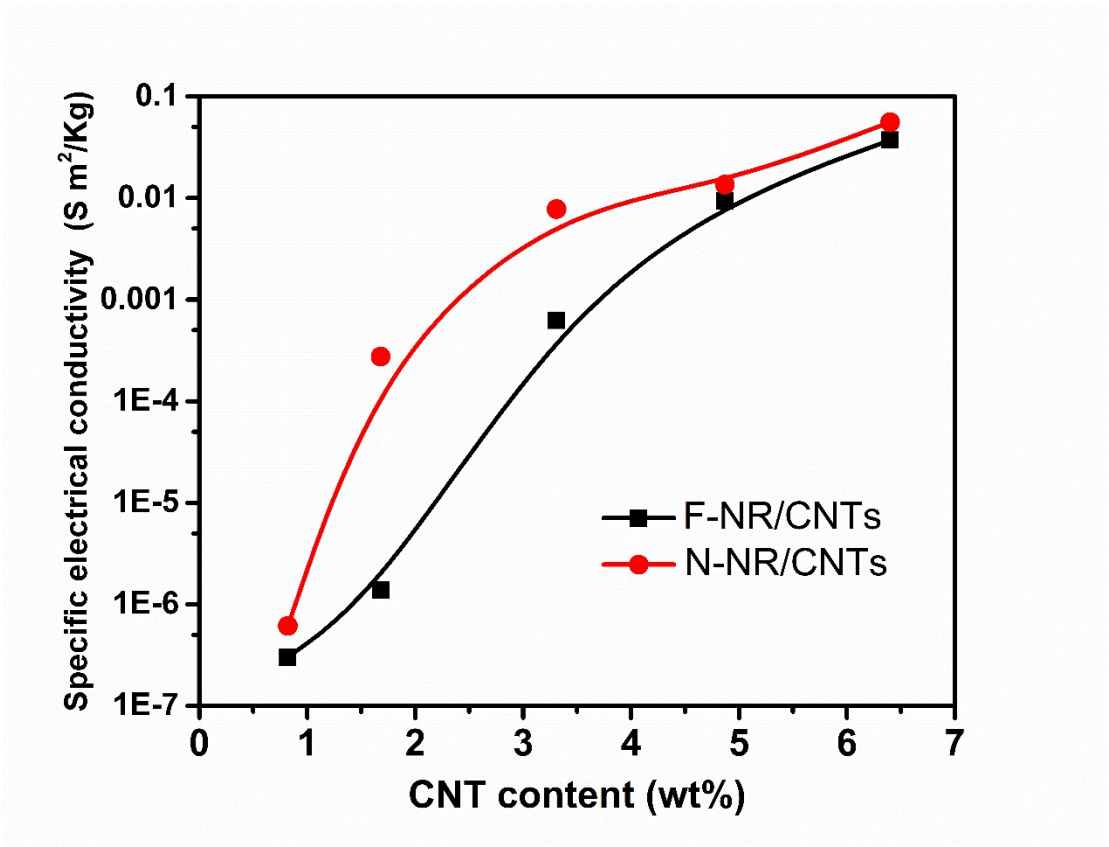

Fig. S5. Specific electrical conductivity of N-NR/CNTs and F-NR/CNTs composites

Table S1: Mechanical properties of F-NR/CNTs composite foams

Sample	Stress (KPa)			Slope (KPa)	
	10%	20%	30%	10~20%	32.5~42.5%
NR foam	2.64	6.80	16.09	41.5	205
F-NR/$CNT_{0.82}$	3.40	10.94	22.79	75.9	199
F-NR/$CNT_{1.68}$	12.90	39.75	80.06	269	-
F-NR/$CNT_{3.31}$	21.07	65.45	110.42	450	658
F-NR/$CNT_{4.87}$	29.83	77.46	144.50	486	1048

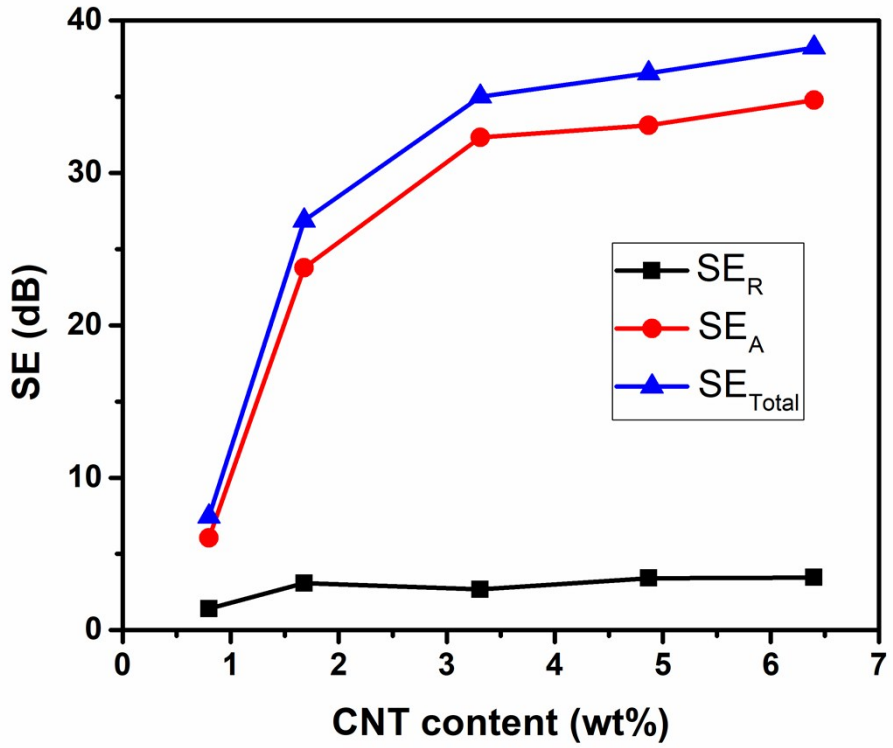

Fig.S6 Shielding by reflection, absorption, and total shielding of N-NR/CNTs composite at the frequency of 10.3 GHz

Fig. S6 shows SE_A, SE_R and $_{SETotal}$ of N-NR/CNT composites. The values of SE_{Total} and SE_A noticeably increase with the CNTs content, while SE_R changes only slightly over the investigated CNT content range. This confirms that absorption of electromagnetic waves plays a major role to EMI SE of N-NR/CNT rather than reflection mechanism.