Supplementary Material

1. Cumulative distribution plot

The cumulative distribution plot represented in **Figure S1**, allows to clearly distinguish the percentage of agglomerates for the different groups of composites, with and without pre-dispersion of MWCNT in PPG. For composites with where MWCNT were pre-dispersed in PPG less than 75 % of agglomerates have areas below ~ 10 μm^2 (Q_3), whereas composites where PPG is not present have only 25 % of agglomerates with areas below ~11 μm^2 (Q_1) and 75 % with areas below ~ 54 μm^2 (Q_3).
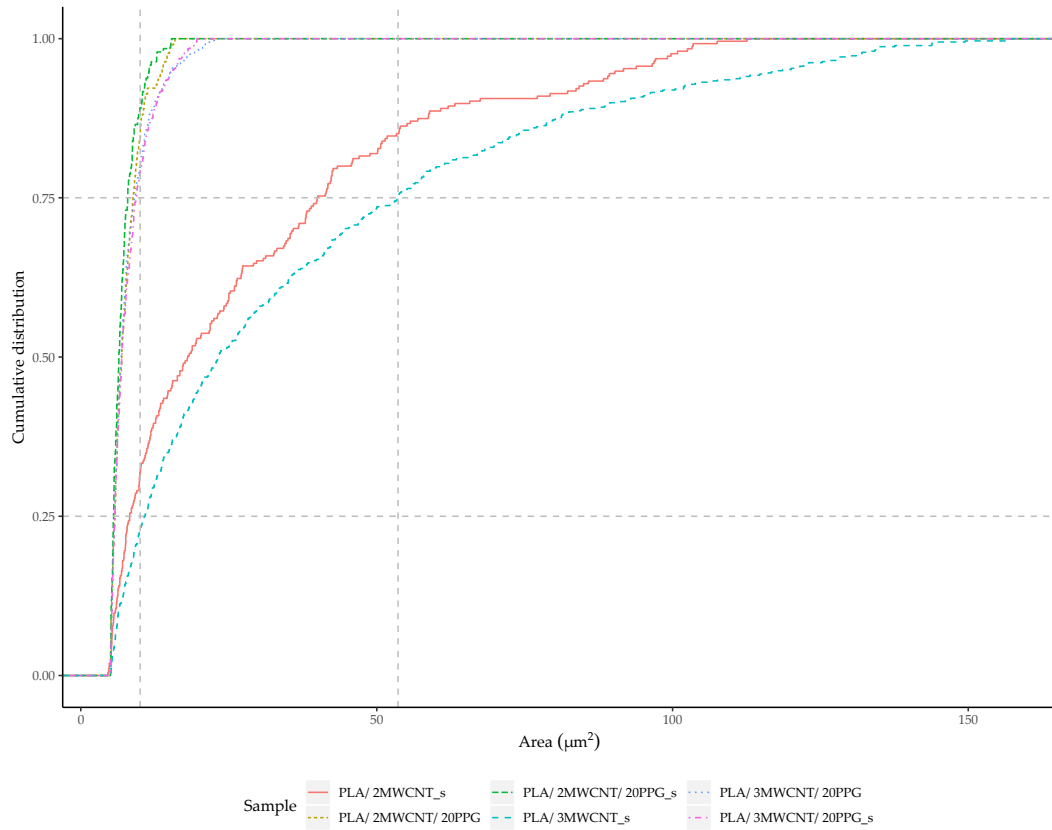

Figure S1. Cumulative distribution plots of the calculated Area, in μm^2, of MWCNT's agglomerates, for the different composites. Vertical dashed lines indicate the maximum value for the 3rd quartile (Q_3) of composites with PPG (10.01 μm^2) and of composites without PPG (53.60 μm^2).

2. Bond assignment of PLA Raman spectra

Raman spectra of PLA is presented in Figure S2, along with its chemical structure and identification of the different bonds according to the Raman shift[1].

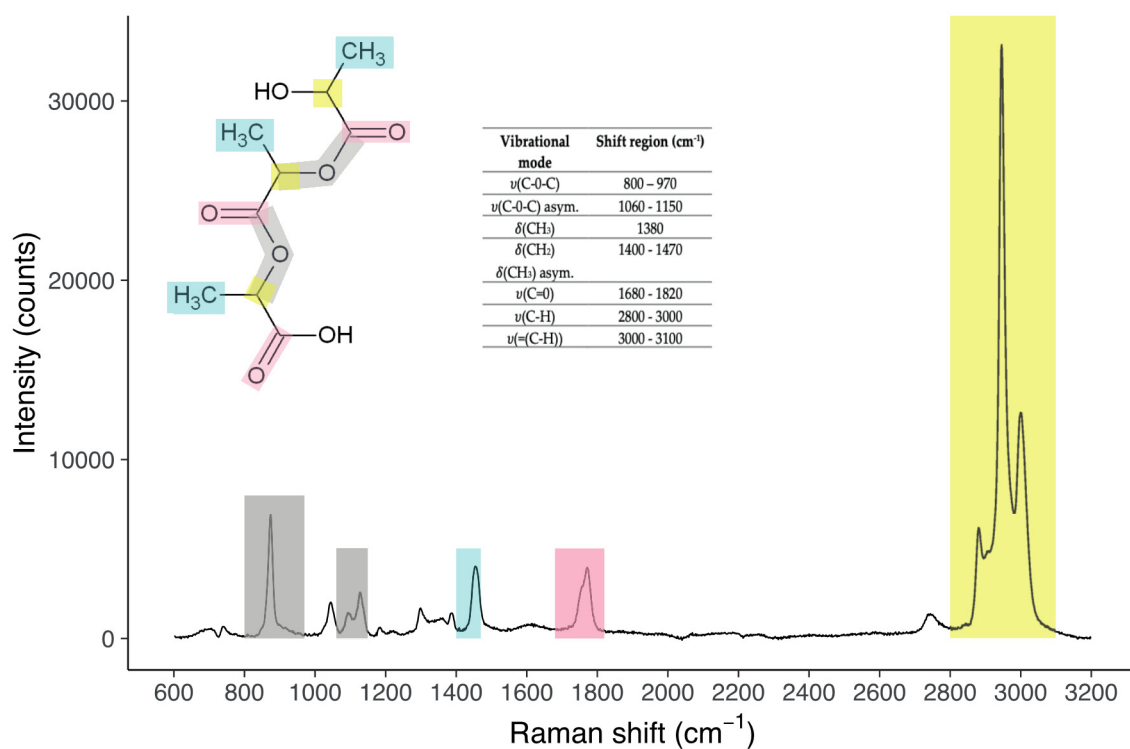| Vibrational mode	Shift region (cm⁻¹)
v(C-0-C)	800 – 970
v(C-0-C) asym.	1060 - 1150
δ(CH₃)	1380
δ(CH₂)	1400 - 1470
δ(CH₃) asym.	
v(C=0)	1680 - 1820
v(C-H)	2800 - 3000
v(=(C-H))	3000 - 3100

Figure S2. Raman spectra of PLA. The grey boxes represent the vibrational stretching modes (symmetrical and asymmetrical) in ether bonds (C – O – C), a blue box the scissoring mode in methyl groups (CH₃), a pink box the vibrational stretching in carbonyl group (C = O), and a yellow box encompassing the vibration symmetrical and asymmetrical stretching modes of carbon – hydrogen bonds (C – H and = (C – H)) of PLA.

1.   Lin-Vien, D., et al., *The handbook of infrared and Raman characteristic frequencies of organic molecules*. 1991: Elsevier.