Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supplementary information for: New Strategy to Elaborate Polymer Composites via Pickering Emulsion Polymerization of a large range of monomers

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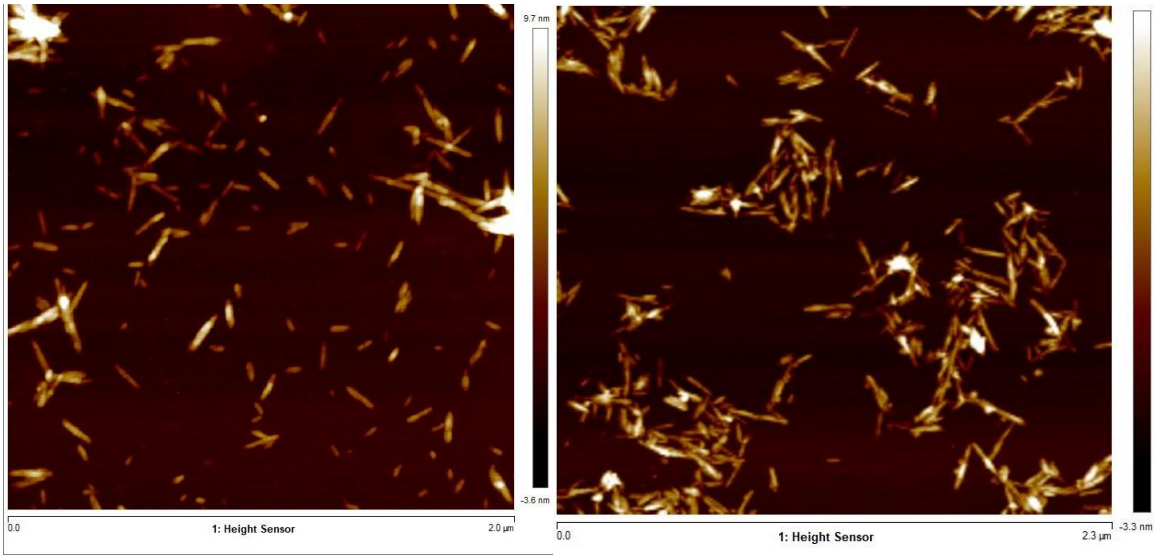

Figure S1: AFM topography images of CNCs (left) and $CNCAs_{10}$ particles (right).

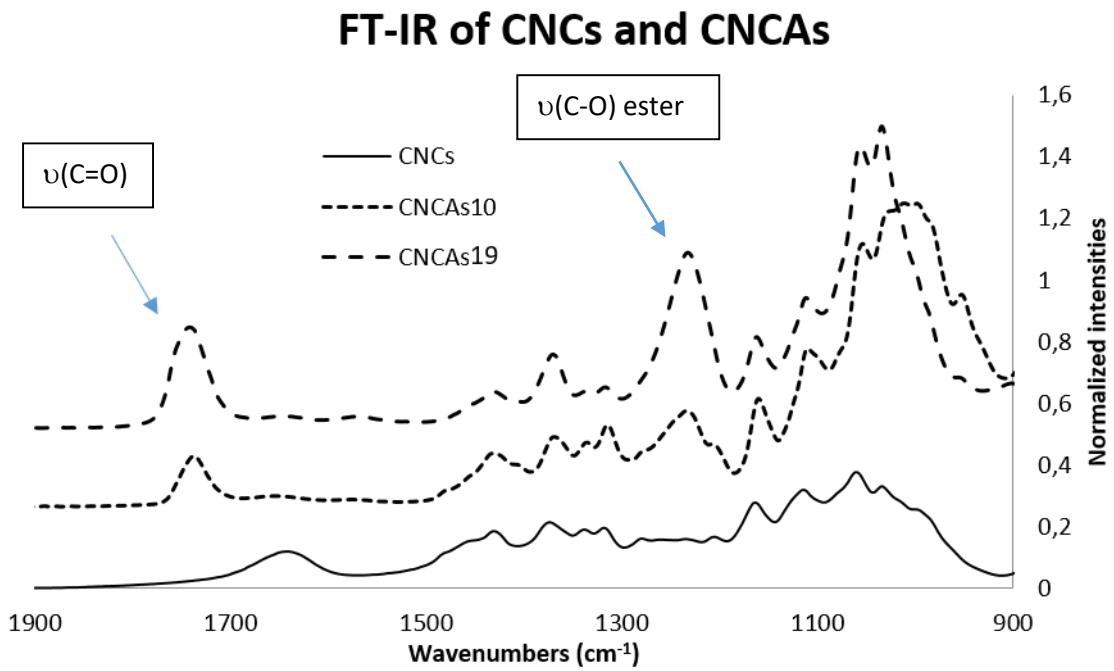

Figure S2: Evolution of the C=O and C-O stretching vibrations of the grafted acetyl groups after reaction with vinyl acetate for 15 min ($CNCAs_{10}$) and 45 min ($CNCAs_{19}$).

The percent ratio of grafted acetyl groups relative to the total number of OH groups in the CNCs ($Ac_{/OH}$%) was deduced from the $I_{C=O}/I_{C-O}$ ratio measured in the FT-IR spectra, using a calibration chart reported in the literature[1]:

$$I_{C=O}/I_{C-O} = 0.0282 \times \textit{wt\% acetyl}$$

Which can be expressed as:

$$\textit{wt\% acetyl} = (I_{C=O}/I_{C-O})/0.0282$$

The percent ratio of acetyl groups relative to the total number of OH groups (Ac%) can be deduced from this equation, using the molecular weight of the anhydroglucose unit (162 $g.mol^{-1}$), the molecular weight of acetate function (43 $g.mol^{-1}$) and the number of available OH groups per anhydroglucose unit:

$$Ac\ (\%) = (\textit{wt\% acetyl} \times 162 \times 100)]/(3 \times 43) \times (100 - \textit{wt\% acetyl})$$

Figure S3: Detailed calculation for the evaluation of the acetyl content in the acetylated particles.

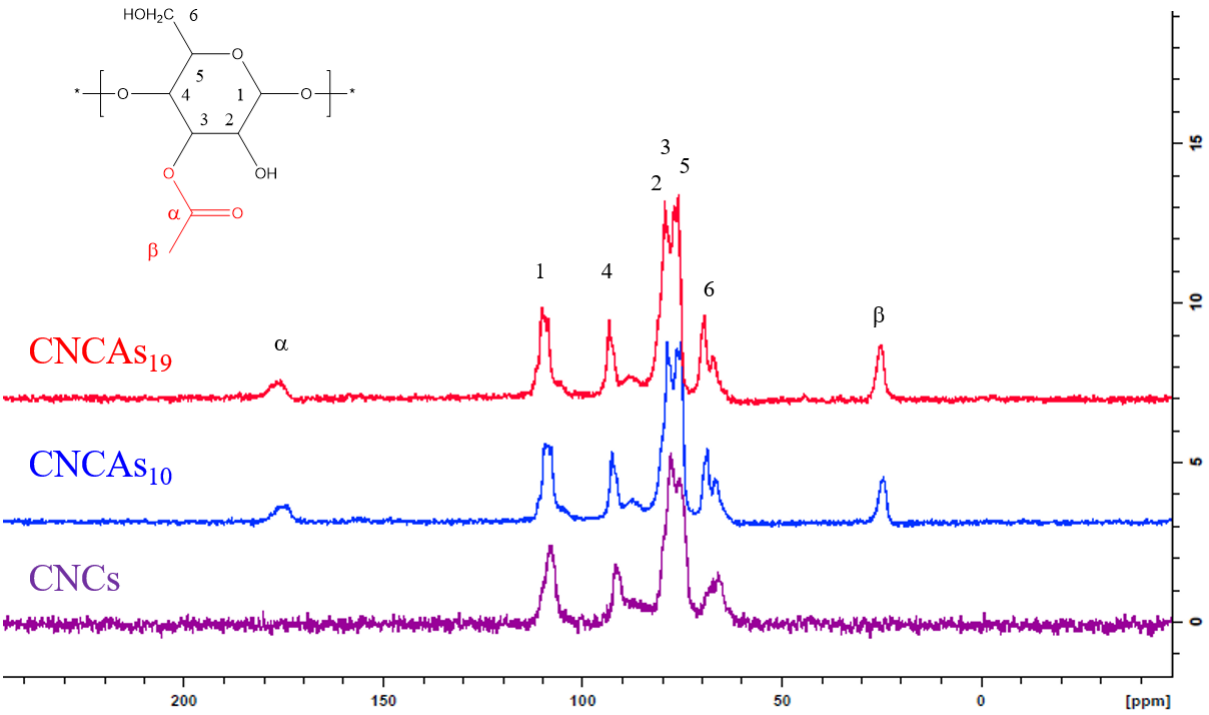

Figure S4: ^{13}C NMR of (purple) non modified CNCs, (blue) $CNCAs_{10}$ and (red) $CNCAs_{19}$.

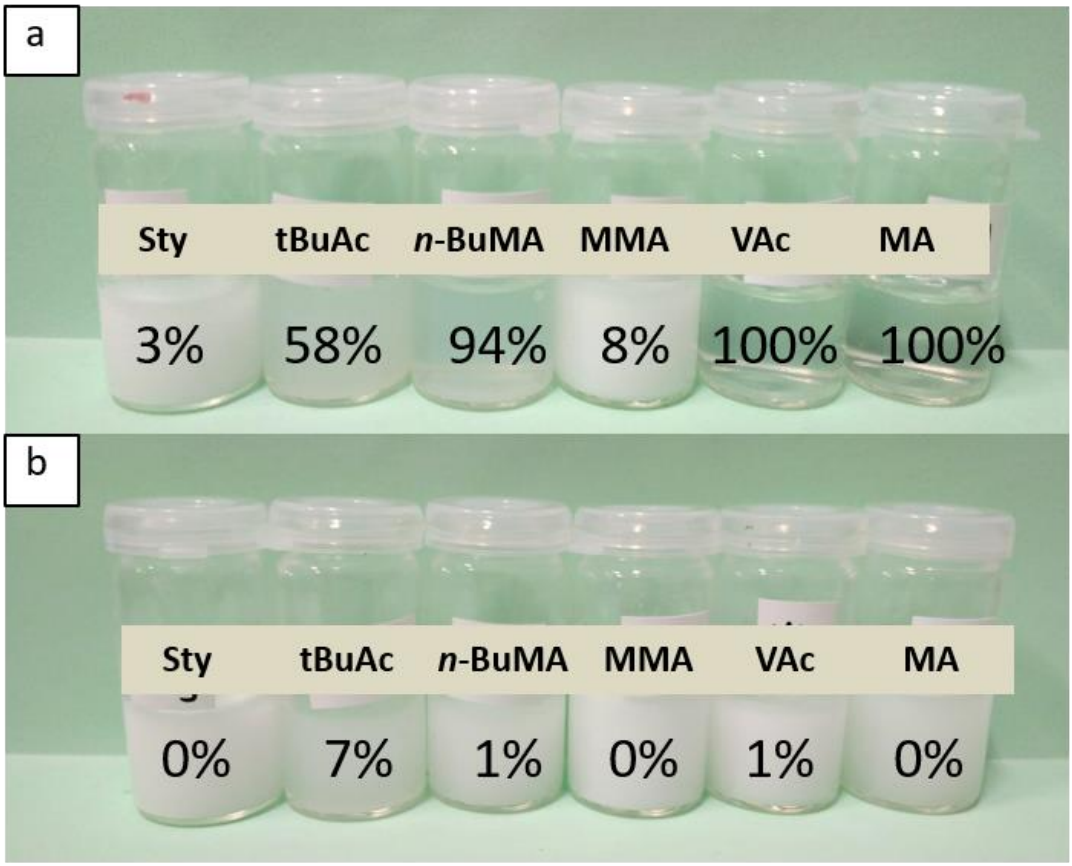

Figure S5: Pictures of the latexes obtained after polymerization and filtration of the O/W emulsions of Styrene, tBuAc, n-BuMA, MMA, VAc and MA stabilized by (a) the CNC_s and (b) the $CNCAs_{10}$ particles. The weight percentage of coagulum removed by the filtration step is also given for each sample.

Figure S6: Pictures of the shaped PBuMA composite at (a) 160°C, and (b) 180°C. Scale bar is 1 cm.

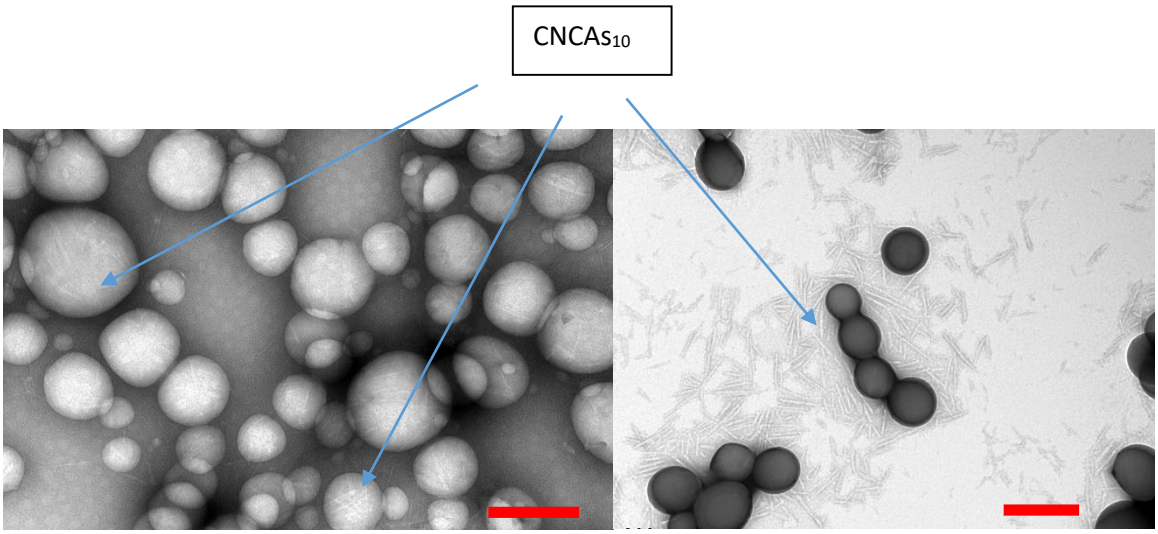

Figure S7: TEM micrography of the PS nanolatex covered by the $CNCAs_{10}$ particles. Scale bar is 300 nm.