Supporting information

Synthesis of cellulose nanocrystal armored latex particles for
mechanically strong nanocomposite films

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**Figure S1**: Data from Figure 2 of the main manuscript showing the zeta potential of different solutions of cellulose nanocrystals with variation of 2,2′-Azobis(2-methylpropionamide) dihydrochloride plotted as a function of CNC/AIBA charge ratio.

a) ![Graph](image_url)

Electronic Supplementary Material (ESI) for Polymer Chemistry.
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Figure S2: a) TEM image of particles from latex L0 (scale bar: 500 nm) and b) Particle size distribution
Figure S3: a) TEM image of CNCs stabilized particles from latex L1 (scale bar: 500 nm) and b) Particle size distribution
Figure S4: TEM images of CNCs stabilized particles from latex L2 (scale bar: a) 500 nm, and b) 100 nm) and c) Particle size distribution
Figure S5: TEM images of CNCs stabilized particles from latex L5 (scale bar: a) 500 nm, and b) 100 nm) and c) Particle size distribution
**Figure S6**: TEM image of CNCs stabilized particles from latex L6 (scale bar: 500 nm)

**Figure S7**: TEM images of CNCs stabilized particles from latex L7 (scale bar: a): 500 nm, and b) 100 nm) and c) Particle size distribution
Figure S8: a) TEM image of CNCs stabilized particles from latex L9 (scale bar: 500 nm) and b) Particle size distribution

Table S1: Characteristics of the latexes and blends used

<table>
<thead>
<tr>
<th></th>
<th>L5</th>
<th>L5:L0 9:1</th>
<th>L5:L0 2:1</th>
<th>L5:L0 1:1</th>
<th>L5:L0 1:2</th>
<th>L0</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNCs (wbm %)</td>
<td>20</td>
<td>18</td>
<td>13.3</td>
<td>10</td>
<td>6.66</td>
<td>0</td>
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<tr>
<td>Particle size per number (dn, nm)</td>
<td>160</td>
<td></td>
<td></td>
<td></td>
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<td>417</td>
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<td>Particle size per weight (dw, nm)</td>
<td>233</td>
<td></td>
<td></td>
<td></td>
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<td>433</td>
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<tr>
<td>Polydispersity (dw/dn)</td>
<td>1.45</td>
<td></td>
<td></td>
<td></td>
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<td>1.04</td>
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<tr>
<td>Tg (°C)</td>
<td>35</td>
<td>29</td>
<td>28</td>
<td>28</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Zeta potential (mV)</td>
<td>-31</td>
<td>-32.5</td>
<td>-33</td>
<td>-29.7</td>
<td>-21.4</td>
<td>42.1</td>
</tr>
</tbody>
</table>


**Figure S9**: Films cast from latex L5 at 55% humidity and a) 23°C and b) 65°C

**Figure S10**: Stress-strain curve for the latex L0 dried at 23 °C and 55% relative humidity for 7 days
Figure S11: Themogravimetric analysis curves of the films dried at 65 °C for 24h
Figure S12 DSC and first derivative showing the variation in glass transition temperature for films cast from latex L0, L5 and their blends.