Electronic Supplementary Material (ESI) for Polymer Chemistry.
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Supporting information

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

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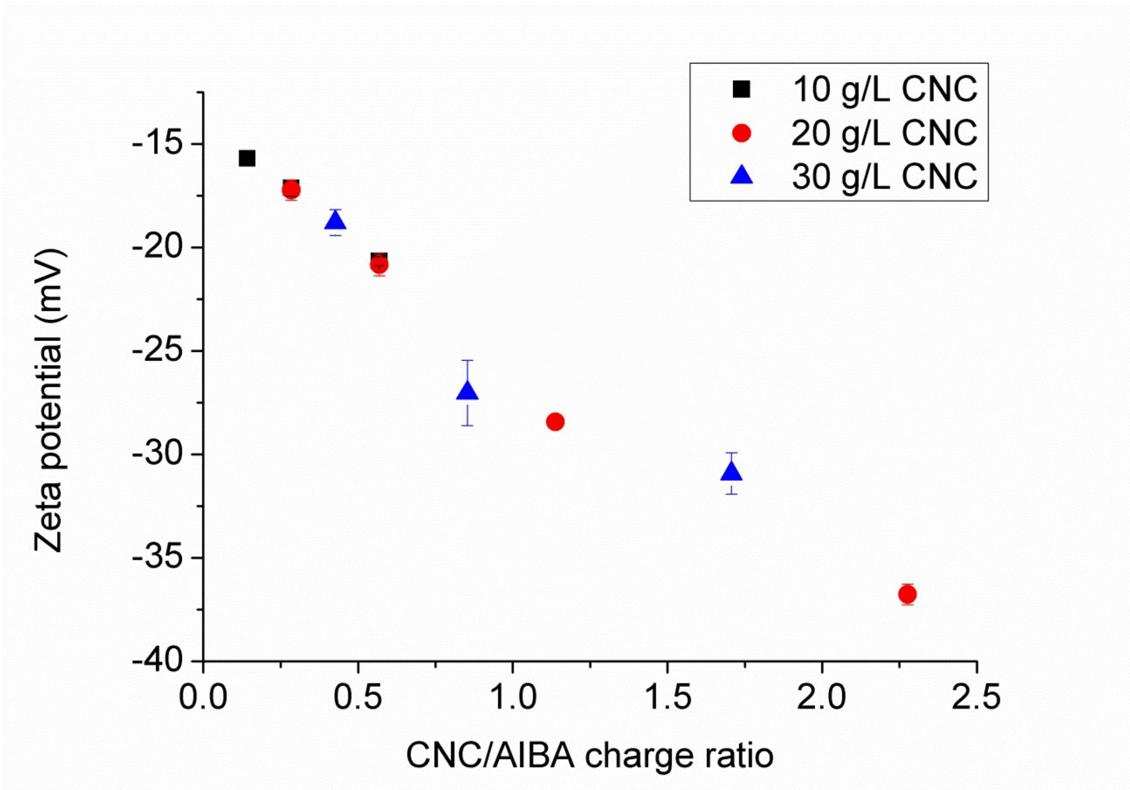


Figure S1: Data from Figure 2 of the main manuscript showing the zeta potential of different solutions of cellulose nanocrystals with variation of 2,2′-Azobis(2-methylpropionamidine) dihydrochloride plotted as a function of CNC/AIBA charge ratio.

a) **b)**

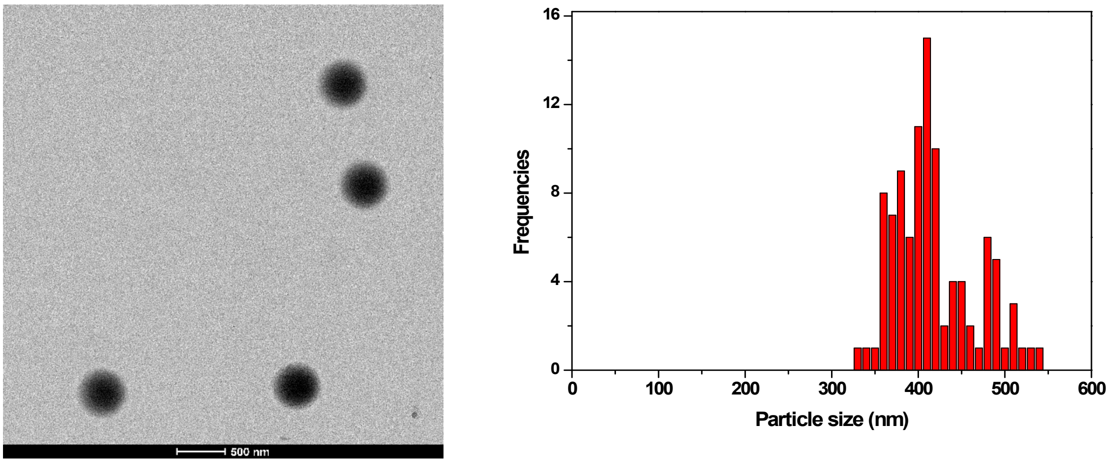


Figure S2: a) TEM image of particles from latex L0 (scale bar: 500 nm) and b) Particle size distribution

a) b)

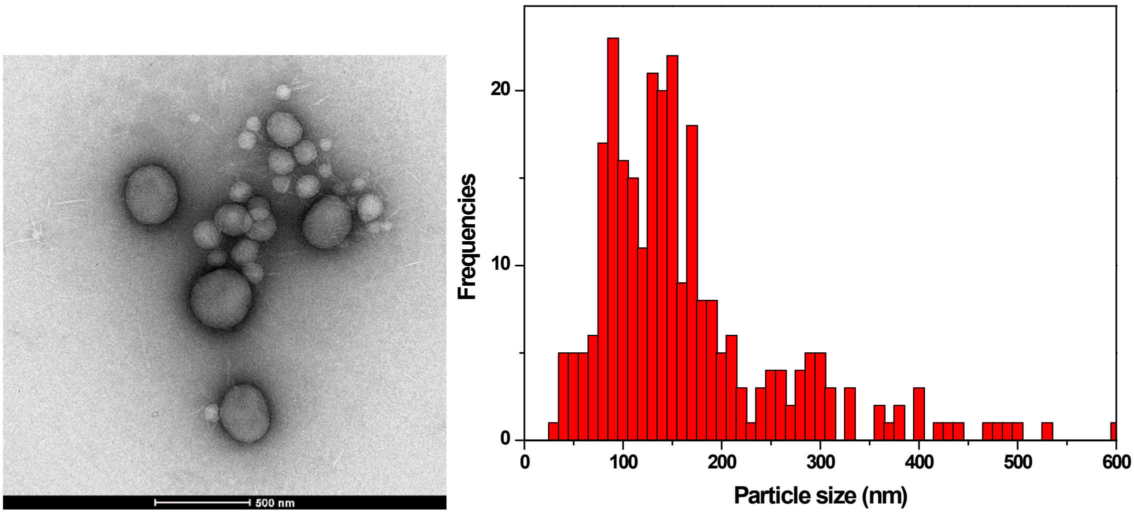
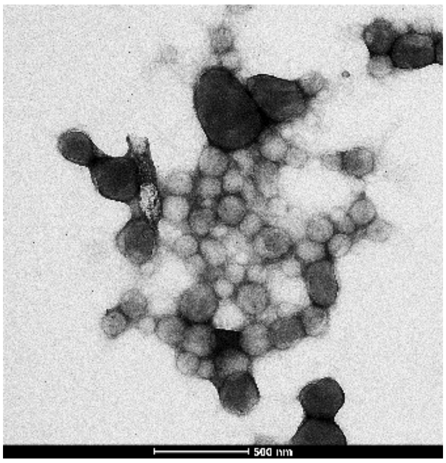
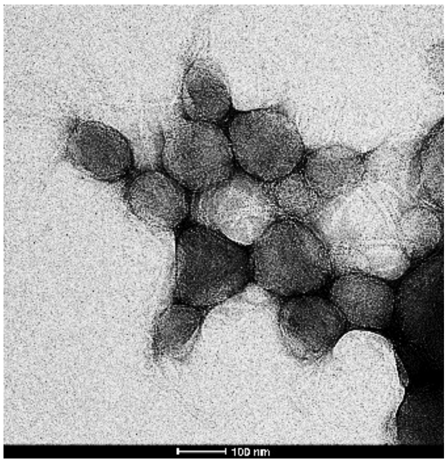


Figure S3: a) TEM image of CNCs stabilized particles from latex L1 (scale bar: 500 nm) and b) Particle size distribution

a)



b)



c)

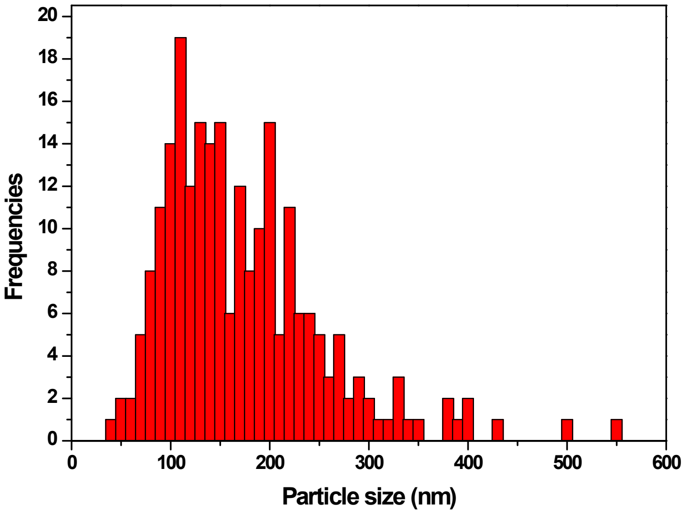
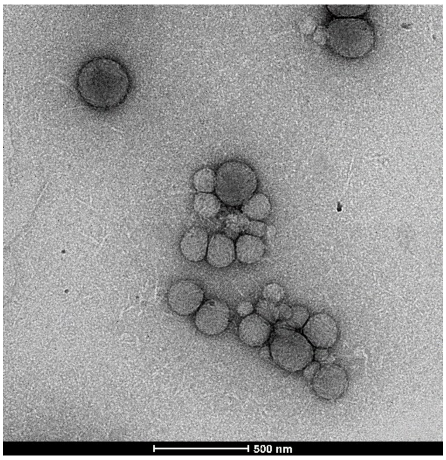
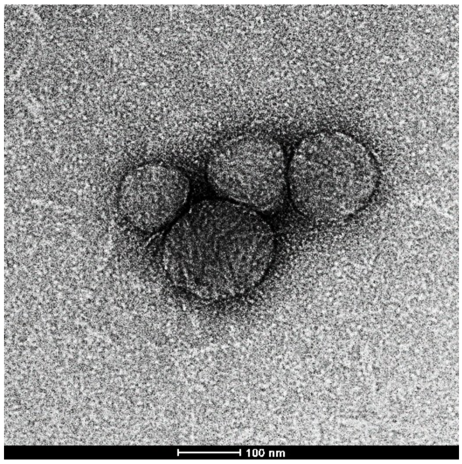


Figure S4: TEM images of CNCs stabilized particles from latex L2 (scale bar: a): 500 nm, and b) 100 nm) and c) Particle size distribution

a)



b)



c)

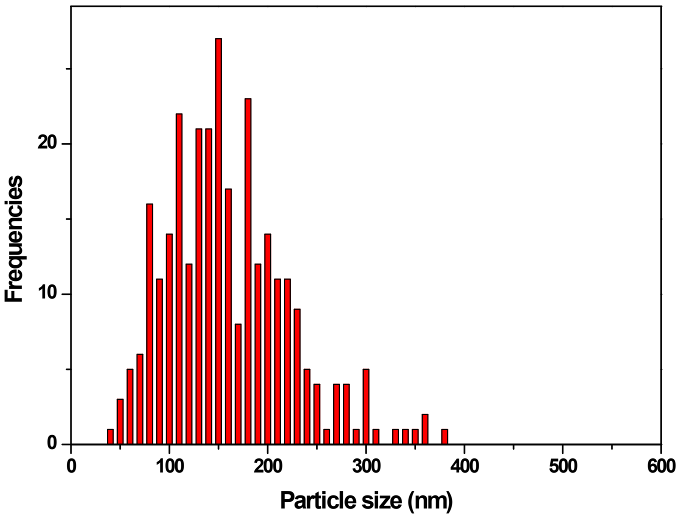


Figure S5: TEM imagess of CNCs stabilized particles from latex L5 (scale bar: a): 500 nm, and b) 100 nm) and c) Particle size distribution

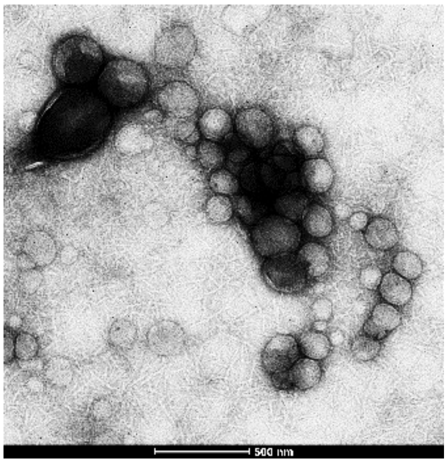


Figure S6: TEM image of CNCs stabilized particles from latex L6 (scale bar: 500 nm)

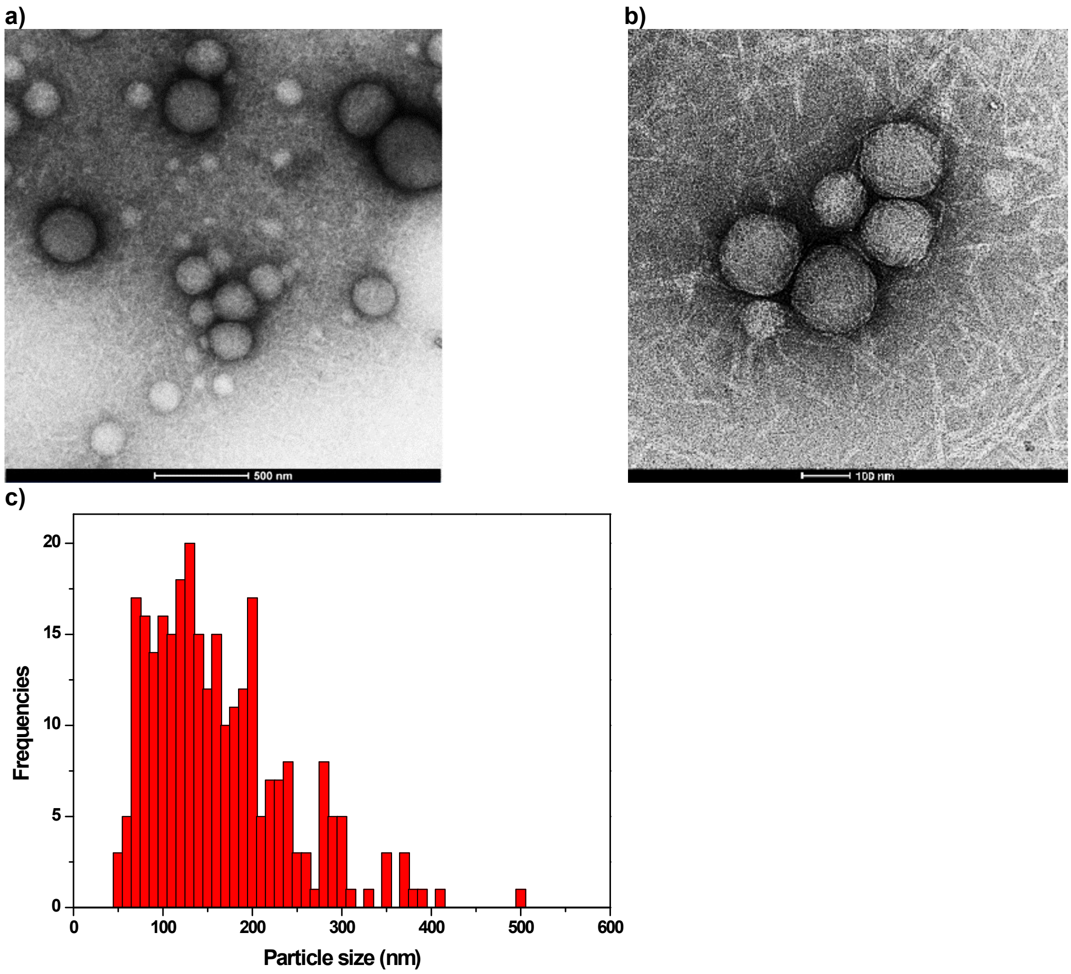
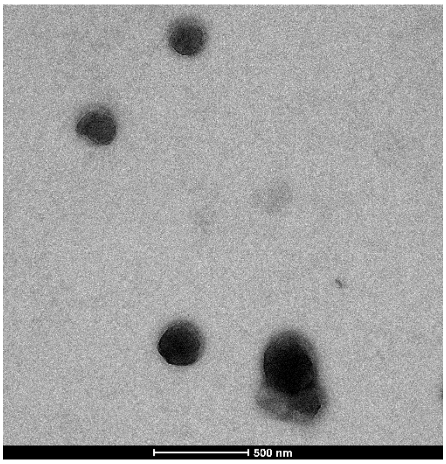


Figure S7: TEM images of CNCs stabilized particles from latex L7 (scale bar: a): 500 nm, and b) 100 nm) and c) Particle size distribution

a)



b)

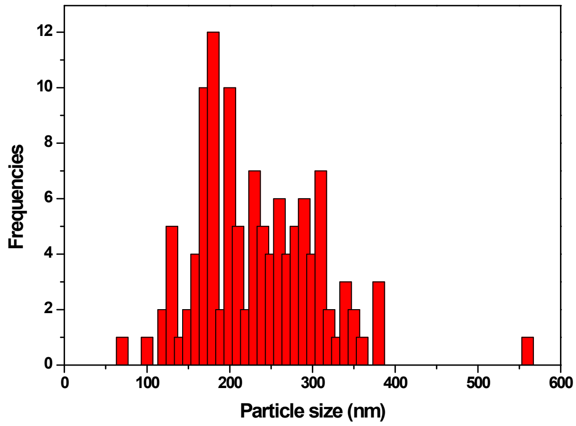


Figure S8: a) TEM image of CNCs stabilized particles from latex L9 (scale bar: 500 nm) and b) Particle size distribution

Table S1: Characteristics of the latexes and blends used

	L5	**L5:L0 9:1**	**L5:L0 2:1**	**L5:L0 1:1**	**L5:L0 1:2**	**L0**
CNCs (wbm %)	20	18	13.3	10	6.66	0
Particle size per number (d_n, nm)	160					417
Particle size per weight (d_w, nm)	233					433
Polydispersity (d_w/d_n)	1.45					1.04
Tg (ºC)	35	29	28	28	25	18
Zeta potential (mV)	-31	-32.5	-33	-29.7	-21.4	42.1

a) b)

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

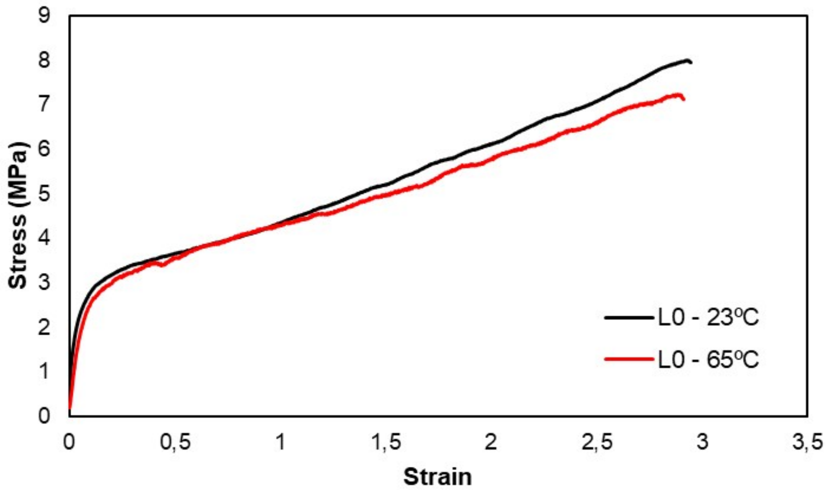


Figure S10: Stress-strain curve for the latex L0 dried at 23 °C and 55% relative humidity for 7 days

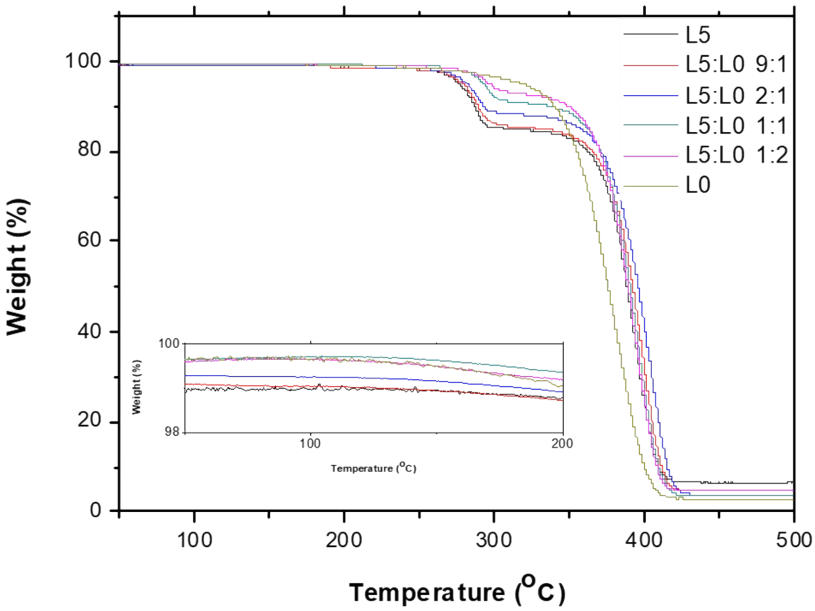


Figure S11: Themogravimetric analysis curves of the films dried at 65 ºC for 24h

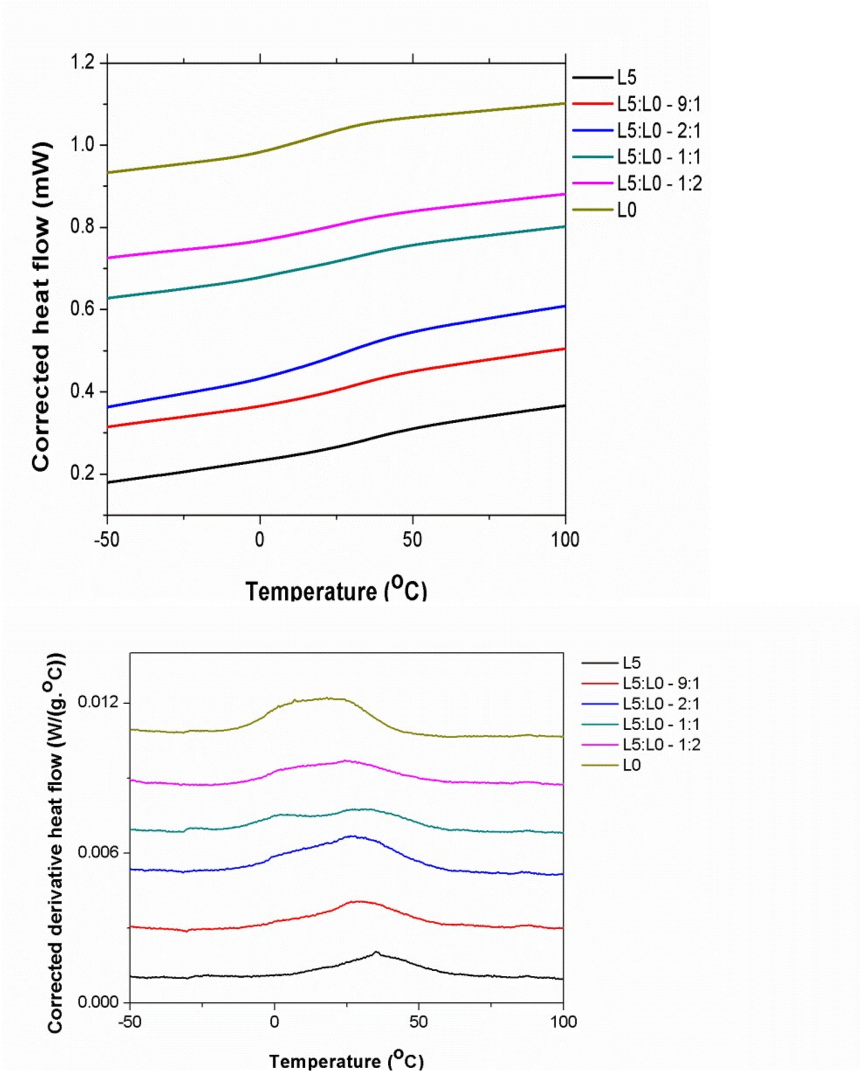


Figure S12 DSC and first derivative showing the variation in glass transition temperature.for films cast from latex L0 , L5 and their blends.