polymers

MDPI

Supporting Information

Effects of Nanofillers based on Cetyltrimethylammonium-Modified Clays in a Polypropylene Nanocomposite

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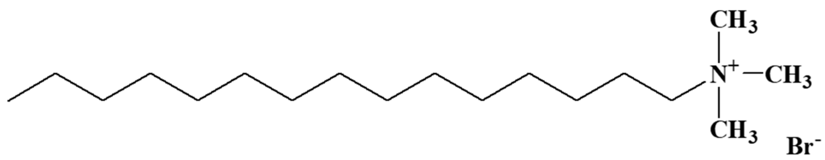
Table S1. CEC, particle sizes, layer charges and aspect ratios of un-modified clays.

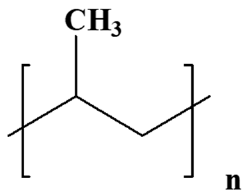
Host	Chemical composition	Diameter of particles (nm)[a]	Cation exchange capacity (CEC) (meq/100g clay)[b]	Layer charge (e^-/unit cell)[b]	Aspect ratio[b]
Mt	$Na_{0.35}K_{0.01}Ca_{0.02}(Si_{3.89}Al_{0.11})(Al_{1.60}Mg_{0.32}Fe_{0.08})O_{10.01}(OH)_2$	~ 1000	115	0.40	250
Mica	$Na_{0.66}Mg_{2.68}(Si_{3.98}Al_{0.02})O_{10.02}F_{1.96}$	~ 1500	120	0.65	1000
Ht	$Na_{0.70}[(Si_{8.00}Mg_{5.50}Li_{0.30})O_{20.00}(OH)_4]$	~ 60	75	0.20	30

[a] The particle sizes measured using a DLS.

[b] Information was obtained from clay industries.



(a) Cetyltrimethylammonium bromide (CTA, $C_{19}H_{42}BrN$)



(b) Polypropylene (PP, $(C_3H_6)_n$)

Figure S1. The molecular structures of (a) cetyltrimethylammonium bromide and (b) polypropylene.

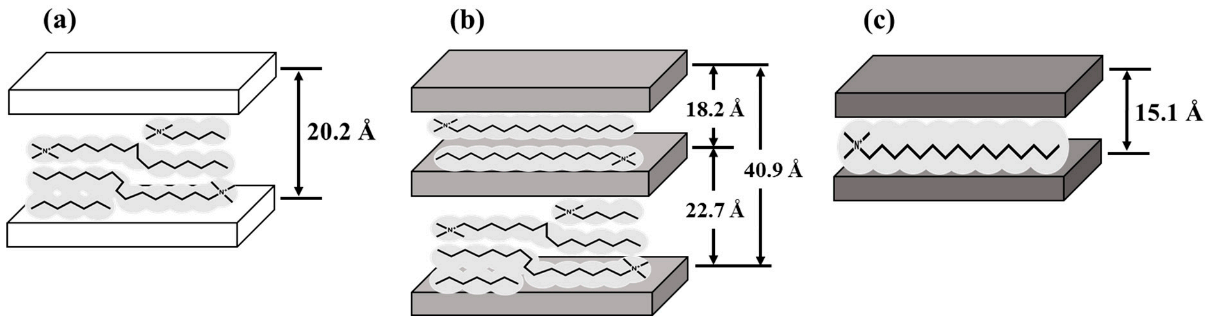


Figure S2. The cationic arrangements of (a) CTA-Mt, (b) CTA-Mica, (c) CTA-Ht.

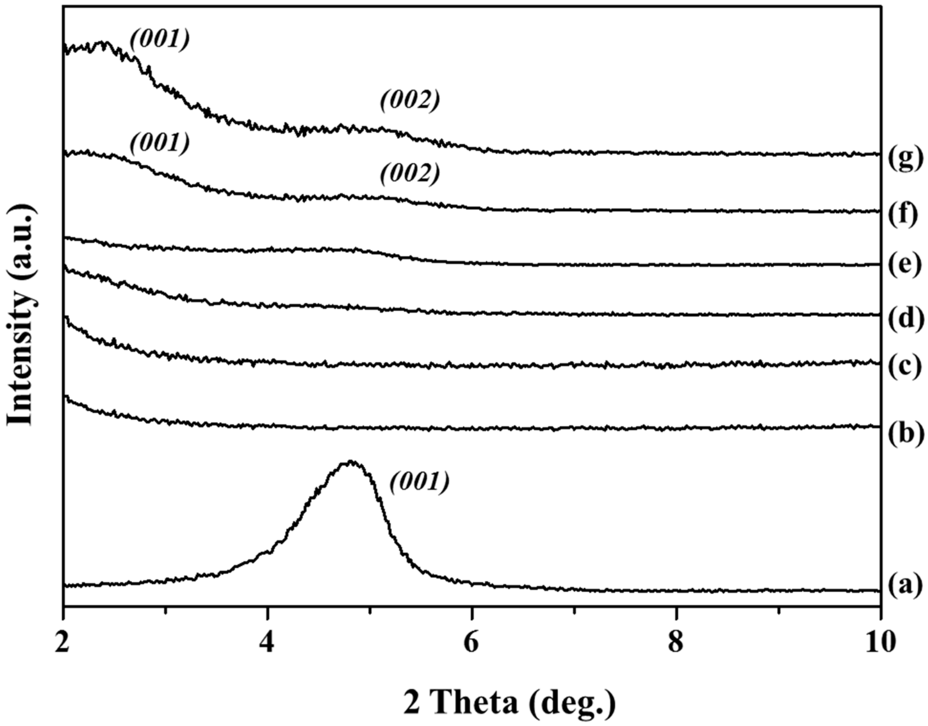


Figure S3. XRD patterns of (a) CTA-Mt (b) pristine PP, (c) 1 mass% (depending on content of CTA-Mt/PP nanocomposite), (d) 3 mass%, (e) 6 mass%, (f) 9 mass%, (g) 12 mass%.

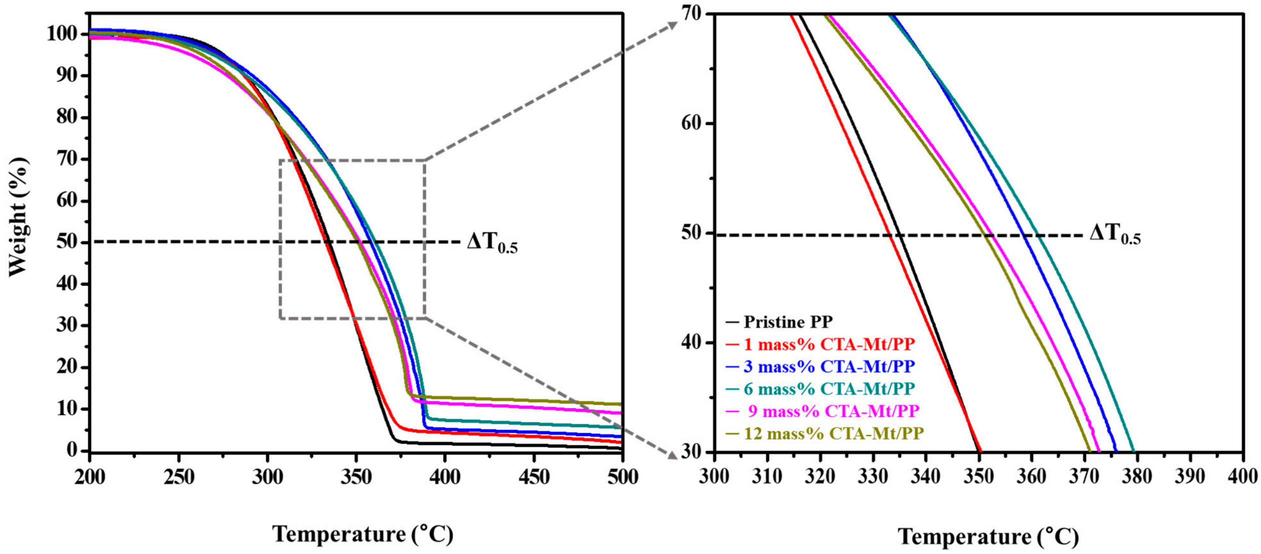


Figure S4. TGA curves of CTA-Mt/PP nanocomposites.

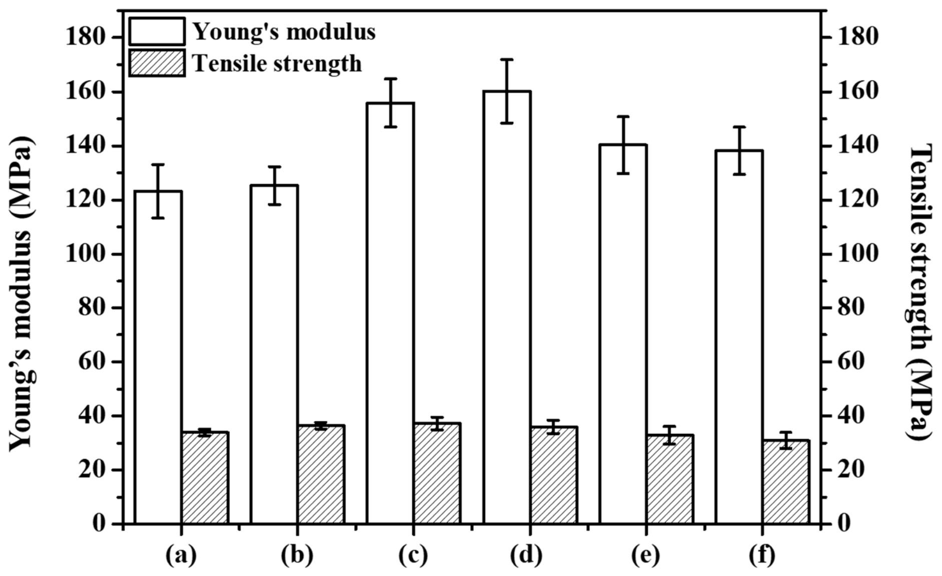


Figure S5. Young's modulus and tensile strength of (a) pristine PP, (b) 1 mass% (depending on content of C TA-Mt/PP nanocomposite), (c) 3 mass%, (d) 6 mass%, (e) 9 mass%, (f) 12 mass%.

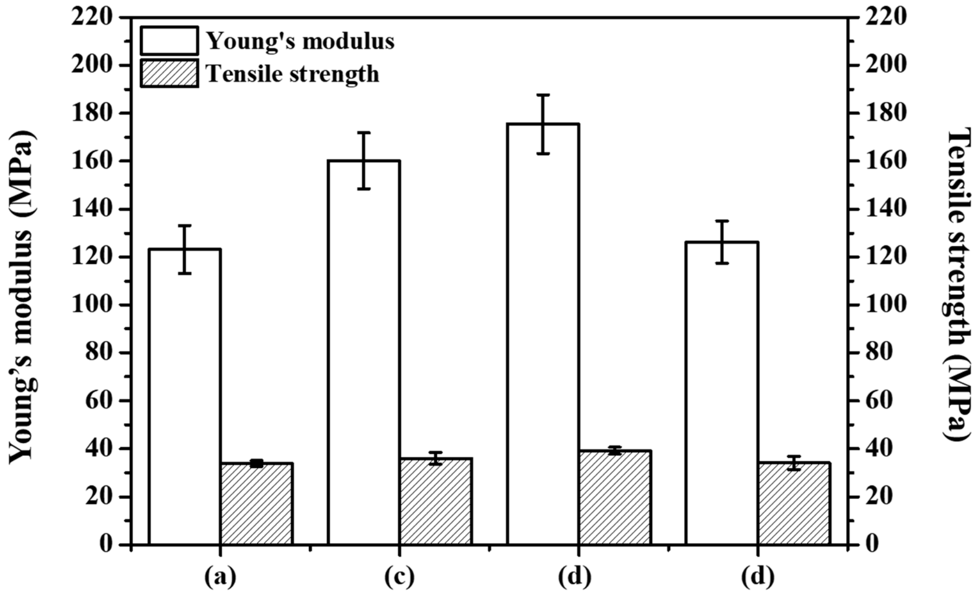


Figure S6. Young’s modulus and tensile strength of (a) pristine PP, (b) 6 mass% CTA-Mt/PP, (c) 6 mass% CT A-Mica/PP and (d) CTA-Ht/PP nanocomposites.