

Communication

# Polyhedral Oligomeric Silsesquioxane (POSS) Surface Grafting: A Novel Method to Enhance Polylactide Hydrolysis Resistance

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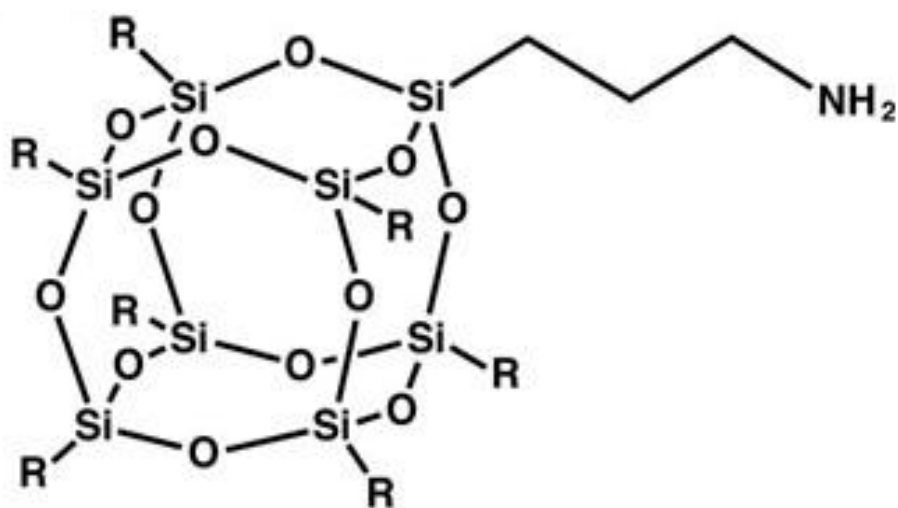
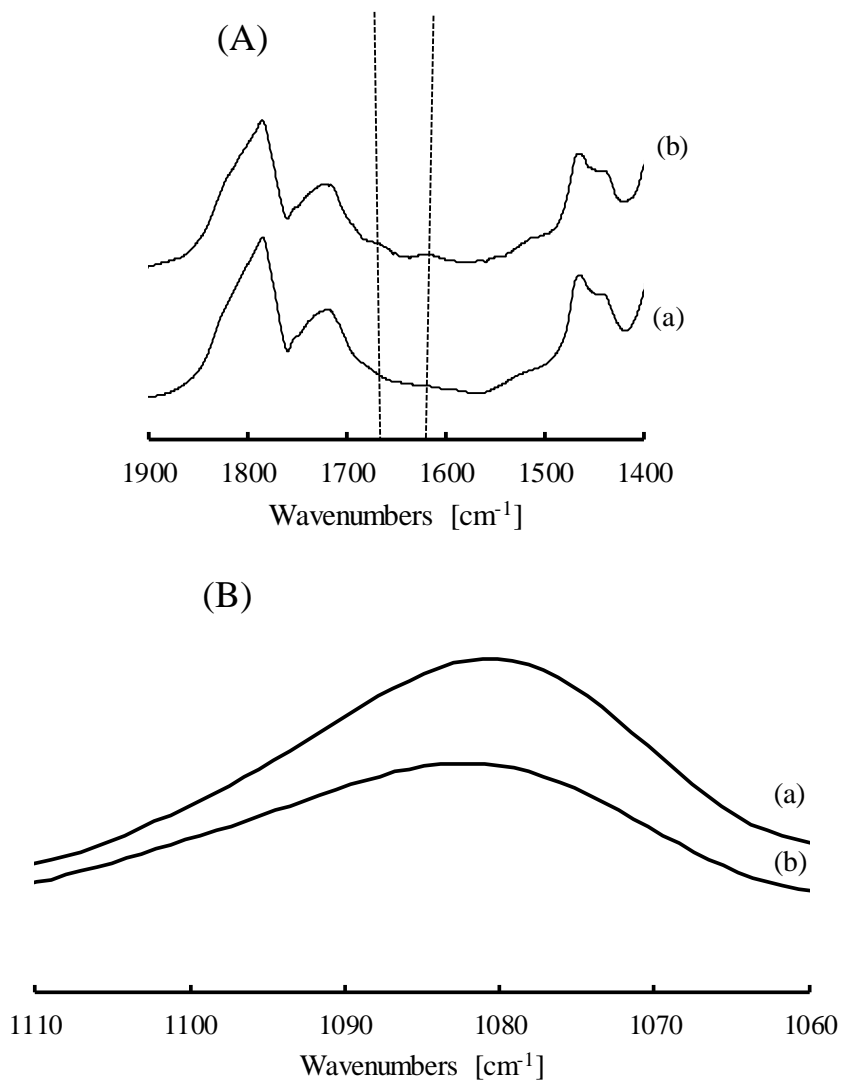
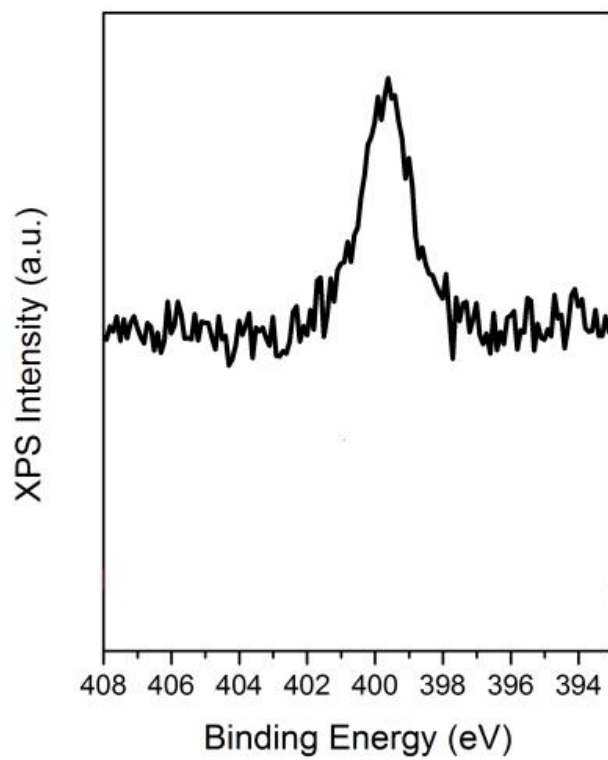


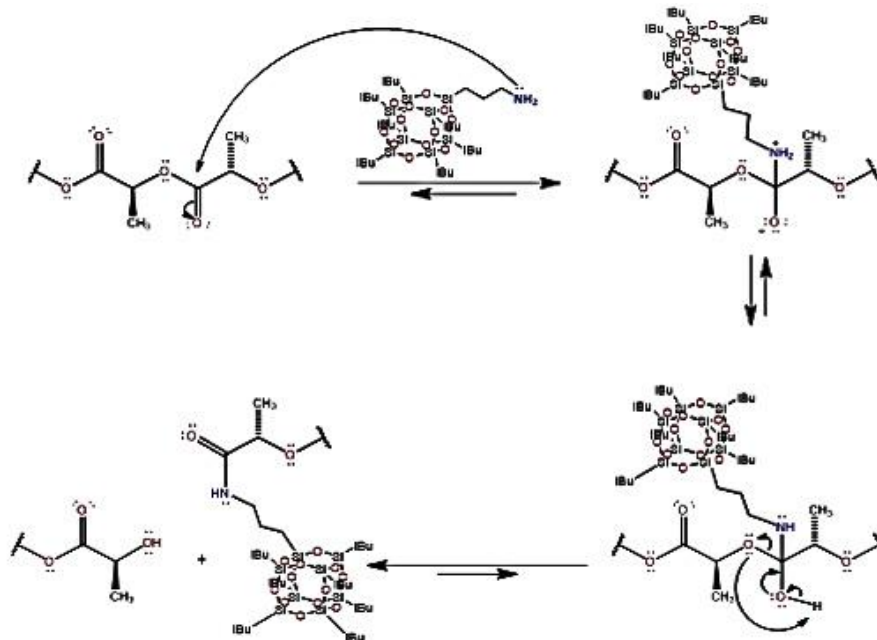
Figure S1. Aminopropyl heptaisobutyl POSS (POSS-NH<sub>2</sub>).



**Figure S2.** (A) FTIR spectra of: (a) PLLA neat film and (b) PLLA\_POSS\_8\_60 film in the range 1900–1400  $\text{cm}^{-1}$ , (B) FTIR spectra of: (a) PLLA neat film and (b) PLLA\_POSS\_8\_60 film in the range 1110–1060  $\text{cm}^{-1}$ .



**Figure S3.** XPS spectrum collected on POSS-NH<sub>2</sub> powders. The data are shown in the energy region typical for N 1s photoelectrons after subtraction of Shirley-type background. Data are shown after normalization.



**Figure S4.** Reaction mechanism of the reaction between POSS-NH<sub>2</sub> and PLLA.

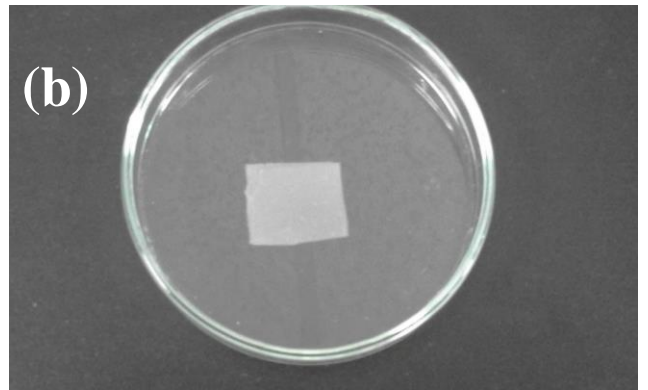
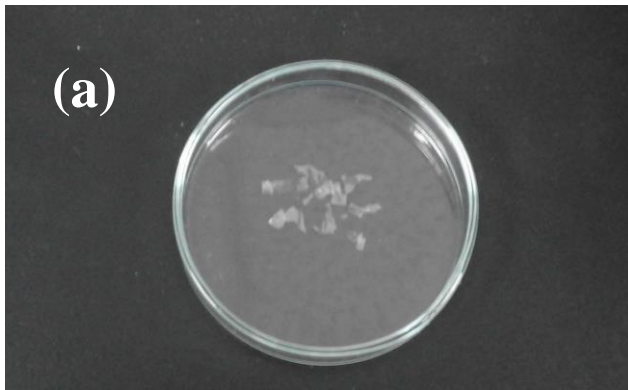
**Table S1a.** DSC results of neat PLLA and of treated films (second heating).

Sample code	T <sub>g</sub> (°C)	T <sub>cc</sub> (°C)	T <sub>m</sub> (°C)	ΔH <sub>cc</sub> (J/g)	ΔH <sub>m</sub> (J/g)
PLLA	60	130	153	5	6
PLLA_POSS_4_40	61	133	154	5	6
PLA_POSS_8_40	60	131	154	4	6
PLLA_POSS_4_60	60	130	153	5	6
PLLA_POSS_8_60	348	130	153	5	6

T<sub>g</sub>: glass transition temperature, T<sub>cc</sub>: cold crystallization temperature, T<sub>m</sub>: melting temperature, ΔH<sub>cc</sub>: enthalpy of the cold crystallization, ΔH<sub>m</sub>: melting enthalpy.

**Table S1b** Characterization results of neat PLLA and of treated films.

Sample code	T <sub>onset</sub> (°C)	T <sub>max</sub> (°C)	Contact angles (°)
PLLA	329	367	71 ± 2
PLLA_POSS_4_40	331	369	87 ± 1
PLA_POSS_8_40	334	371	91 ± 2
PLLA_POSS_4_60	341	374	91 ± 2
PLLA_POSS_8_60	348	378	101 ± 1



**Figure S5.** Photos of (a) PLLA film and (b) PLLA\_POSS\_8\_60 film after being in contact with the buffer for 4 weeks at 50 °C.