Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Tethered Polyhedral Oligomeric Silsesquioxane on Lamellar Single Crystal of Poly(D-lactide) XIN-FEI YU, WEN-BIN ZHANG, RYAN VAN HORN, RODERIC QUIRK, STEPHEN CHENG — Lamellar single crystals can be used as the templates for nanoparticles. Poly(D-lactide) (PDLA) was successfully ?grafted from? the polyhedral oligomeric silsequioxane (POSS) by coordination-insertion ring opening polymerization (ROP) of D-lactide. The reaction was conducted in toluene at 60 ^{o}C and initiated by hydroxypropyl(isobutyl) POSS nanoparticles with tin(II) 2-ethylhexanoate (SnOct2) as the catalyst. Under these conditions, the molecular weight was controlled well by adjusting the monomer-initiator molar ratio monitored by size exclusion chromatography (SEC) and proton nuclear magnetic resonance (^{1}H NMR). ^{13}C NMR spectroscopy showed that the synthesized poly(D-lactide) was more than 99% isotactic. Single crystals of POSS-PDLA grown in dilute solution and were examed by atomic force microscopy (AFM) and transmission electron microscopy (TEM). Tethering density of POSS was controlled by the molecular weight of PDLA crystalline chain and by varying the crystallization temperature. Tethering density was increased as molecular weight of PDLA was lower and crystallization temperature was increased higher.

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Date submitted: 20 Nov 2008 Electronic form version 1.4