Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Thermally induced lamellar reorganization and thickening in spherical poly (L-lactic acid) crystalsome MARK STAUB, HAO QI, CHRISTOPHER LI, Drexel Univ — Understanding fundamental aspects of spherical crystals is important for a variety of applications such as encapsulation and drug delivery. The curved nature of these crystals gives rise to differences in key crystallographic concepts such as grain boundaries and defect formation when compared to flat crystals. This curved crystallography is difficult to study experimentally, especially at the nanoscale. Our group has recently shown how an oil in water miniemulsion can be used to direct the crystallization of poly (L-lactic acid) (PLLA) at a curved liquid/liquid interface. This produces nanosized, polymer single-crystal-like capsules termed crystalsomes with increased stability and mechanical properties compared with non-crystalline counterparts. This system will serve as our model for examining spherical crystallography. In this work, combined wide angle X-ray diffraction, Atomic force microscopy, and differential scanning calorimetry is employed to examine how the curved interface effects crystal thickening and reorganization compared to flat PLLA crystals. The influence of degree of curvature on these processes is also studied by examining crystalsomes with differing diameters.

Mark Staub
Drexel Univ

Date submitted: 11 Nov 2016 Electronic form version 1.4