## Abstract Submitted for the MAR17 Meeting of The American Physical Society

Thermomechanical properties and transparency of self-reinforced polylactide composites with stereocomplex polylactide nanofibers<sup>1</sup> NARUKI KUROKAWA, ATSUSHI HOTTA, Department of Mechanical Engineering, Keio University — By compounding stereocomplex polylactide (sc-PLA) nanofibers into poly(L-lactide) (PLLA), we obtained an sc-PLA/PLLA composite with high transparency and sufficient mechanical properties. One of the major problems in the practical use of PLLA is its poor thermomechanical properties especially in the amorphous state: when heated, the storage modulus of pure PLLA drastically decreases through its glass transition temperature ( $T_g$ ~68 degree). The fiber composite method could be an efficient way to solve the problem, while possibly avoiding marked reduction in its transparency. To maintain the high transparency of the original PLLA, the sc-PLA fiber diameter was optimized to be lower than the optical wavelength. In addition, to enhance the transparency, the reflective index should be closer and the sc-PLA fiber surface should be compatible with the PLLA matrix. Thus, the sc-PLA fibers of 367 nm in the average diameter were mixed with PLLA to improve its thermomechanical properties. At the sc-PLA nanofiber concentration of 15 weight percent, the storage modulus was increased by 21.8 times as compared with that of PLLA at 80 degree. It was also found that the transparency of PLLA did not drastically change after compounding.

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