

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Synthesis and Characterization of Branched Poly(ester urea)s with Different Branch Density¹ JIAYI YU, MATTHEW BECKER, Univ of Akron — A new class of *L*-phenylalanine-based poly(ester urea)s (PEU) was developed that possess tunable mechanical properties, water uptake ability and degradation rates. Our preliminary data has shown that 1,6-hexanediol *L*-phenylalanine-based poly(ester urea)s possesses an elastic modulus nearly double that of poly(lactic acid). My work details the synthesis of a series of *L*-phenylalanine-based poly(ester urea)s possessing a variation in diol chain length and in branch density and shows how these subtle structural differences influence the mechanical properties and *in vitro* biodegradation rates. The elastic moduli span a range of values that overlap with several currently clinically available degradable polymers. Increasingly the diol chain lengths increases the amount of flexible segment in the chemical structure, which results in reduced elastic modulus values and increased values of elongation at break. Increasing the amount of branch monomer incorporated into the system reduces the molecular entanglement, which also results in decreased elastic modulus values and increased values of elongation at break. The *L*-phenylalanine-based poly(ester urea)s also exhibited a diol length dependent degradation process that varied between 1-5 % over 16 weeks. Compared with PLLA, PEUs degrade more quickly and the rate can be tuned by changing the diol chain length. PEUs absorb more water and the water uptake ability can be tuned by changing the branch density.

¹This work was supported by Akron Functional Materials Center.

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Date submitted: 14 Nov 2014

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