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Title:A Fast Degrading Odd-Odd Aliphatic Polyester-5,7 Made by Condensation Polymerization for Biomedical Applications

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Abstract:A fast enzymatic degradable aliphatic all-odd-polyester-5,7, based on 1,7-heptanedioic acid (pimelic acid) and 1,5-pentanediol, was synthesized by polycondensation. The structural characterization of the polyester was done using 1D- and 2D-NMR spectroscopic techniques. The properties of the resulting polyester-like crystallization behavior, enzymatic degradation, thermal stability, etc., were investigated using differential scanning calorimetry, wide-angle X-ray diffraction, scanning electron microscopy and gel-permeation chromatography. Terahertz time-domain spectroscopy was employed to determine the glass transition temperature, which could not be revealed reliably by conventional thermal analysis. The properties of all-odd-polyester-5,7 were compared with a well-known enzymatic degradable polyester (polycaprolactone). The results indicated that polyester-5,7 has a crystal structure similar to PCL, but a much faster degradation rate. The morphology of polyester-5,7 film during enzymatic degradation showed a fibrillar structure and degradation began by surface erosion. (C) Koninklijke Brill NV, Leiden, 2011

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