

Production and application of fully bio-based and biodegradable nylon-4,4 and nylon-5,4

이종언, 안정호, 김인호, 리생, 이상엽<sup>†</sup>  
한국과학기술원  
(leesy@kaist.ac.kr<sup>†</sup>)

Nylons are widely used polyamides and the production of fully biobased nylons has been of great interest but not yet realized. Here, we report production and characterization of bionylon-4,4 and -5,4, two rarely studied nylons, using succinic acid, 1,4-diaminobutane, and 1,5-diaminopentane produced by fermentation of metabolically engineered bacteria. The synthesized bionylons exhibit excellent thermotolerance and water absorptivity. Bionylons are also successfully used as a matting agent to reduce surface gloss of ASA. Furthermore, bionylons are found to be biodegradable, providing further environmental benefit upon disposal. The strategy for the synthesis of fully biobased nylons comprising fermentative monomer production and purification, polymerization, characterization, and application reported here can serve as a guideline for synthesizing other fully biobased polymers from renewable resources. This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557) from the Ministry of Science and ICT, through the National Research Foundation (NRF) of Korea.