Recyclable plant-oil-based polyesters for fibers and textiles

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Abstract

A major challenge in the establishment of a sustainable textile industry is the non-circular design of today's fiber materials.(1-5) In their overall life cycle most textiles contribute significantly to the anthropogenic greenhouse gas emissions, resource consumption and environmental microplastics pollution. The described research will provide bio-sourced, plant-oil-based, non-persistent synthetic polyester fibers and textiles that are scalable, processable and closed-loop recyclable under mild technical conditions.(5) A key feature is a polyethylene-like crystallinity combined with low densities of in-chain functional groups, and an efficient enzymatic depolymerization.(5) The polyesters are based on different dicarboxylic acids from plant oils (3-6), spun into a variety of fibers and transformed into textile fabrics. The polymer, fiber and fabric products as well as the recycling processes will be advanced to a prototype level.(3-6)
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