

Textile Waste Presents A Major Burden On The Environment

Michael Cuiffo*

Professor at Department of Materials Science and Chemical Engineering

Textile waste presents a major burden on the environment, contributing to climate change and chemical pollution as toxic dyes and finishing chemicals enter the environment through landfill leachate. Moreover, the majority of textile waste reaching landfills is discarded clothing, which could be reused or recycled. Here we investigate environmentally benign morphology changing of cotton textiles as a precursor for reintegration into a circular materials economy. At 50 °C using low concentrations of acids and bases, the interfiber structures of woven cotton were successfully degraded when treated with the following sequence of chemical treatment: citric acid, urea, sodium hydroxide,

ammonium hydroxide, and sodium nitrate. Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy, X-ray photoelectron spectroscopy (XPS) and scanning electron microscopy (SEM) reveal separation of the constituent fibers without depolymerization of the cellulose structure, and streaming potential measurements indicate that surface charge effects play a key role in facilitating degradation. The proposed reaction procedures show feasibility of effective waste-fabric recycling processes without chemically intensive processes, in which staple fibers are recovered and can be re-spun into new textiles.

**Address for Correspondence: Michael Cuiffo, Professor at Department of Materials Science and Chemical Engineering, E-mail: mcuiffo@gmail.com*

Copyright: © 2021 Michael Cuiffo. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received 05 June 2021; **Accepted** 14 June 2021; **Published** 24 June 2021

How to cite this article: Michael Cuiffo. "Textile Waste Presents A Major Burden On The Environment." *J Textile Sci Eng* 11 (2021): 445.