Recycling of textile waste via indirect gasification

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Abstract

The demand for textile production has been constantly increasing alongside with population expansion and the economic development of the society. Reaching the end of life, textile products are becoming waste, which is nowadays mostly incinerated and landfilled. Pathways of fiber recycling are well established for single-material garments i.e. cotton. Despite this, several textile products contain a blend of both synthetic and natural fibers which are hard to sort and recycle. Those abounded textile waste fractions can, via feedstock recycling, be converted to high valuable chemicals, such as ethylene or BTXs. The principle of the process is to brake polymer chains from the textile to its constituents, monomers and syngas, which are then used as chemicals, replacing fossil fuels as feedstock. This paper analyses the potential of feedstock production from indirect gasification of textile waste through experimental work in a lab scale reactor. Additionally, the monomer recovery of textiles with diverse chemical structure will be discussed: natural polymer type-cellulose, synthetic polymer type-polyester, nylon, acryl and bends.

Feedstock recycling, indirect gasification, monomer recovery, textile waste recycling.

Professional Biography



Isabel Cañete Vela is a PhD student at Chalmers University of Technology, Sweden. She conducts experimental research in plastic waste gasification, both in a large-scale gasifier (2-4 MW_{th}) and lab scale reactor. Her purpose is to understand and optimize this process aiming to produce valuable chemicals that can be reintroduced in petrochemical processes and by that closing the loop of those streams. She focuses on plastic-based waste that contains a mix of several polymers and other materials, for example automotive shredded residue or synthetic textile waste, which are hard to separate through mechanical recycling and generally end up in incineration or landfills.

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Any Comments: Track 17: Textile Recycling