

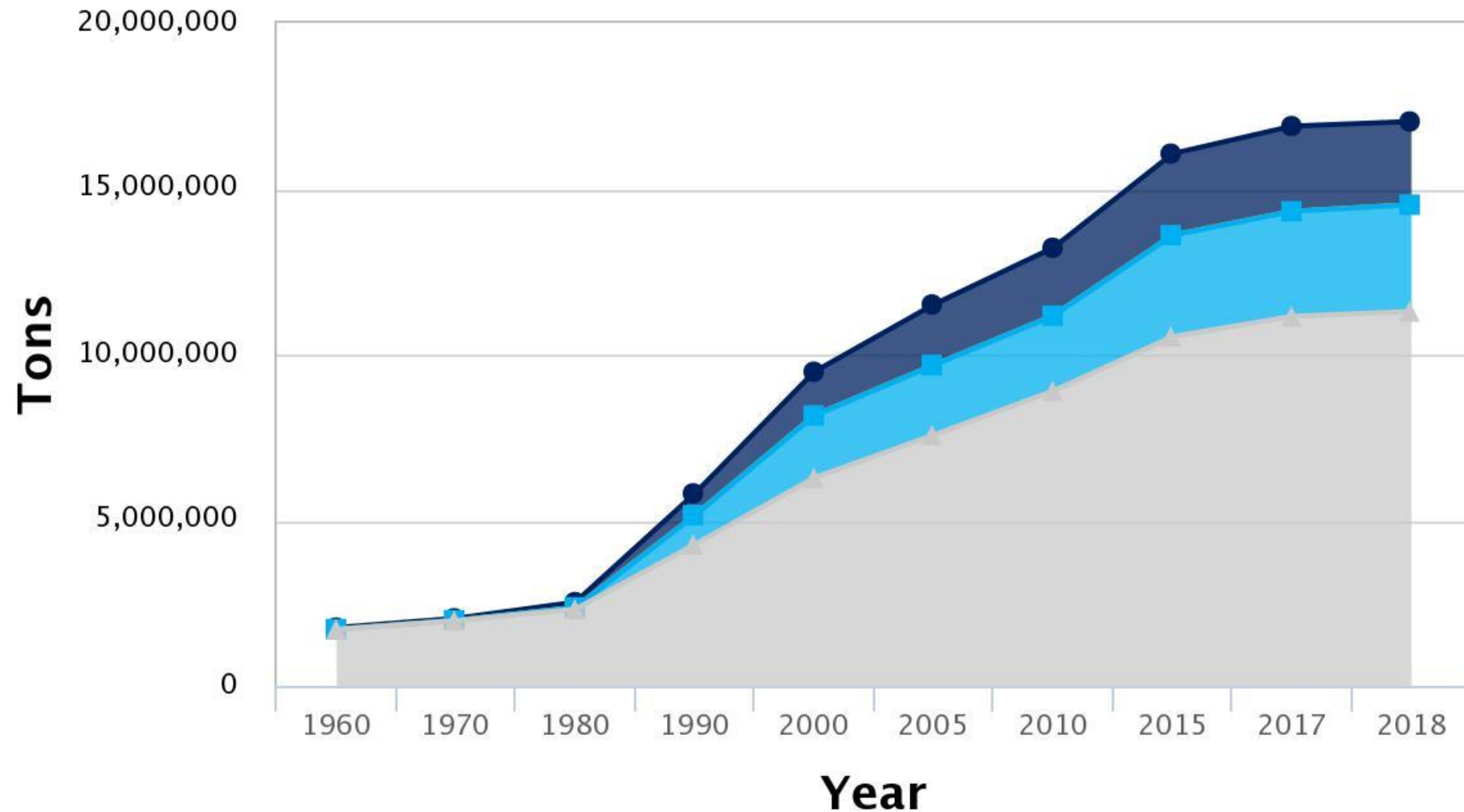
A person in an orange jacket is climbing a large, dark rock face. The background shows a dense forest of green trees and a body of water in the distance.

# Opportunities and Challenges in Textile Recycling and Re-use

Patagonia Inc.

Natalie Banakis

# Textiles Waste Management: 1960–2018



*Click on legend items below to customize items displayed in the chart*

**Recycled** **Composted** **Combustion with Energy Recovery** **Landfilled**

# Why is textile recycling so challenging?

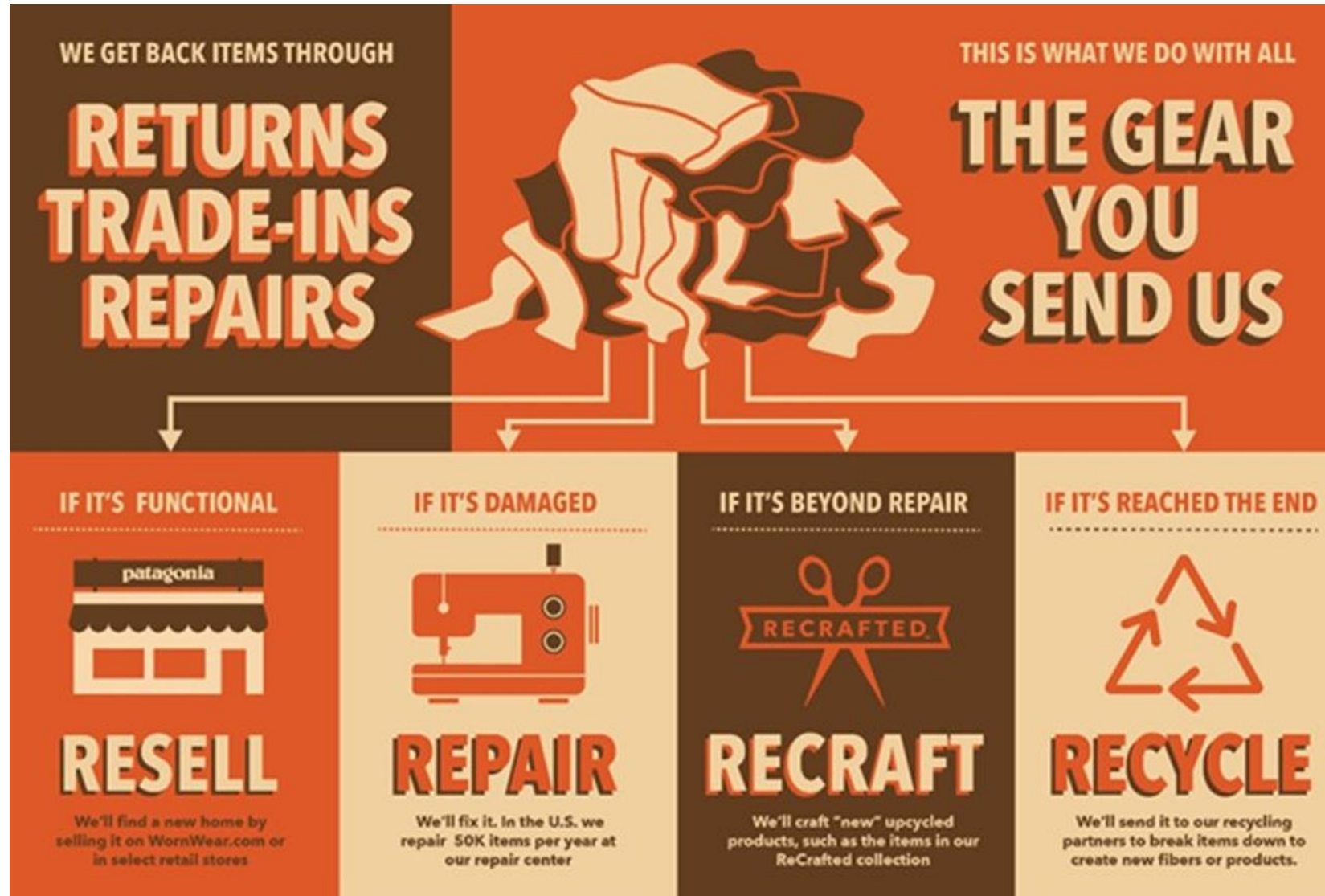


Photo Credit: Austin Siadek

- No infrastructure for large scale collection and sorting of textile waste.
- Rely on end customer to have the desire and knowledge to do the right thing.
- Technical textiles are extremely difficult to recycle using traditional methods.

# Worn Wear

- Worn Wear is Patagonia's resale platform
- Allows our customers to have a platform to sell their used gear to avoid the landfill and keep the gear in use.
- Not all types of garments are accepted.



# Sorting and Collection

## Manual Sorting

Extremely limited due to cost & time

## Near-infrared Spectroscopy

### *Advances*

- SIPTex - Swedish Innovation Platform for Textile Sorting announced at the end of 2020 to test technology

### *Limitations*

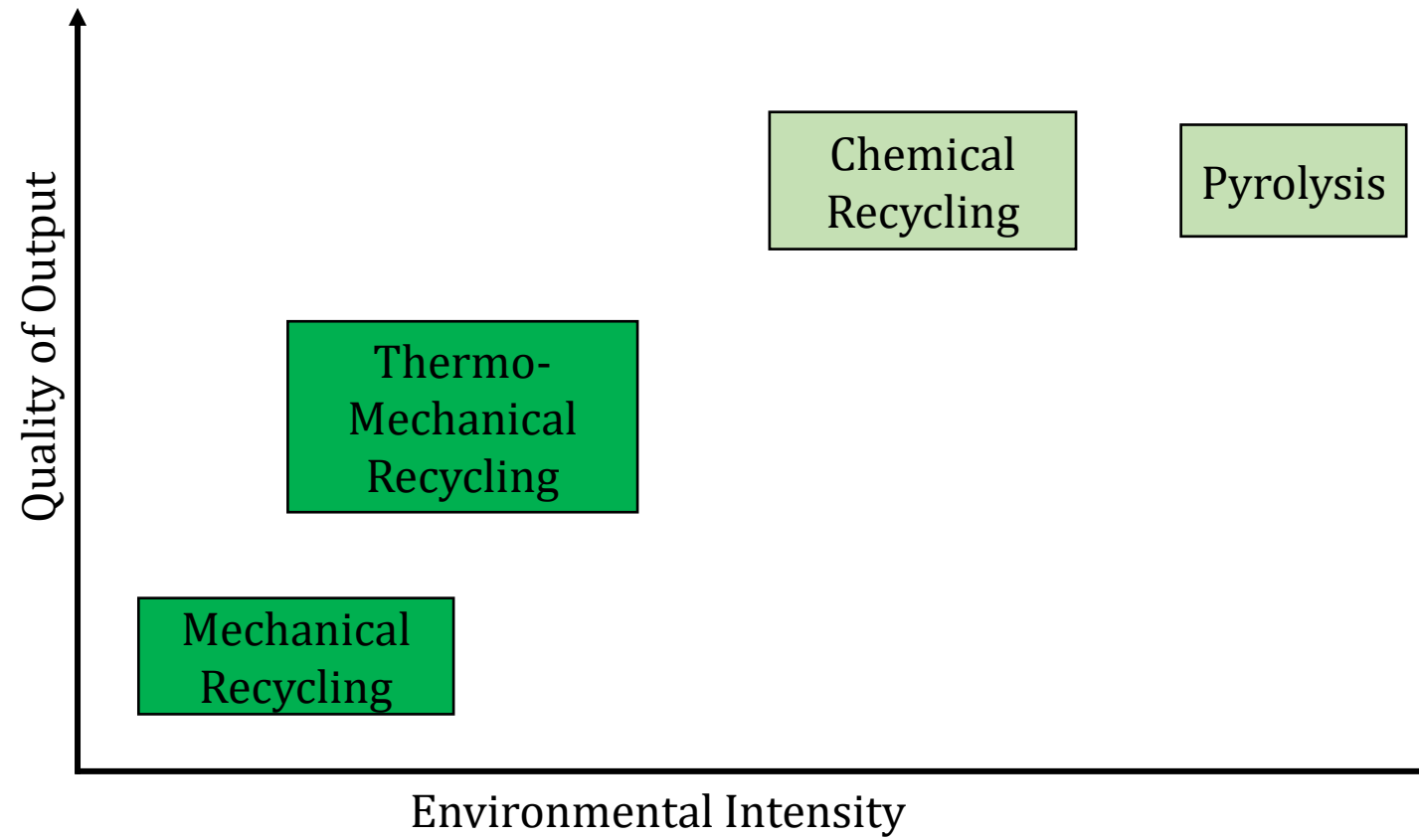
- Struggles to identify content percentages in polymer blends
- Can only identify surface layer and can be confused by coatings
- Adoption is limited

## Technology Gaps

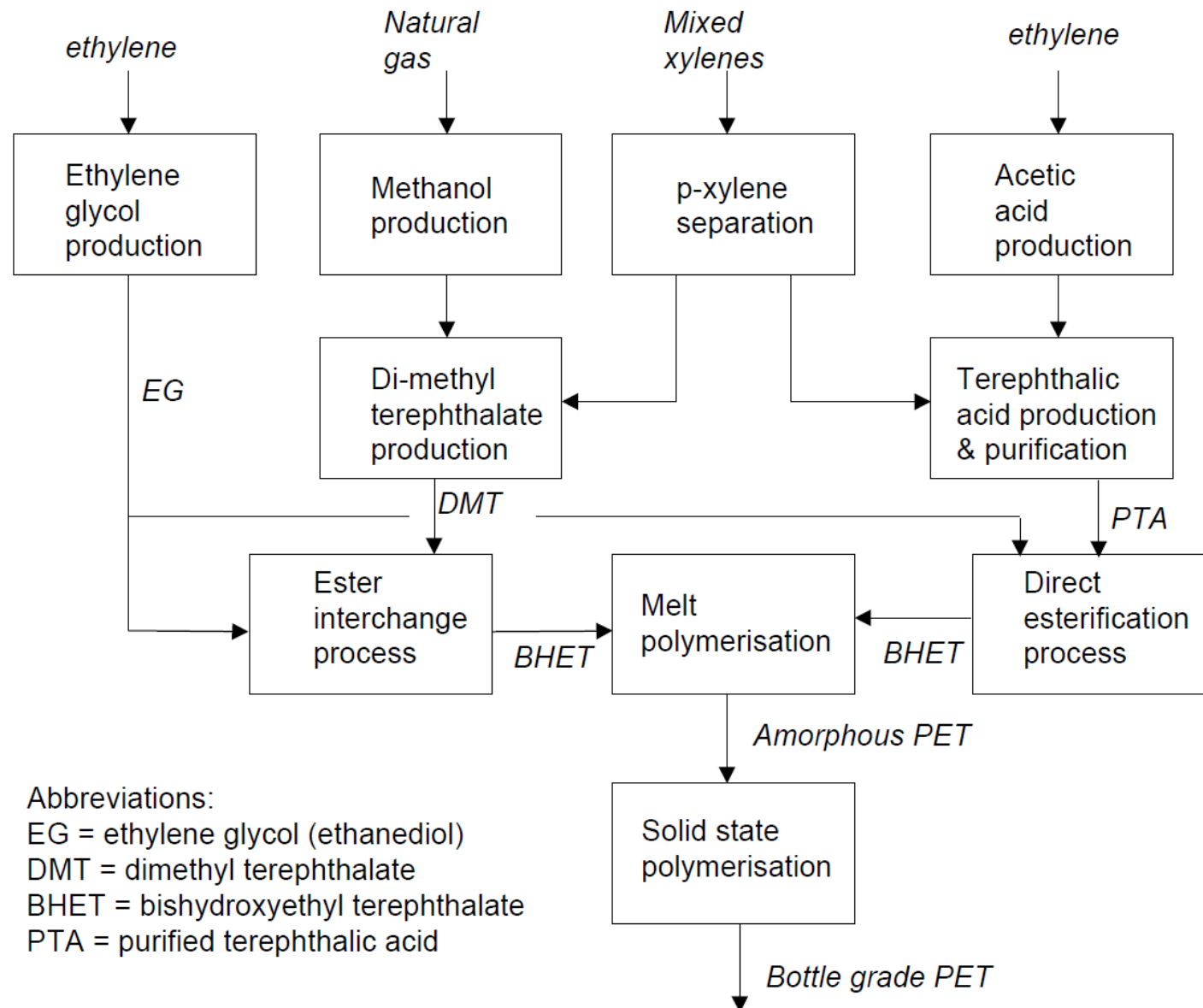
- Still need recycling solutions for many of the composite materials



# There is need for all types of recycling.



# PET Recycling is well established...



Abbreviations:

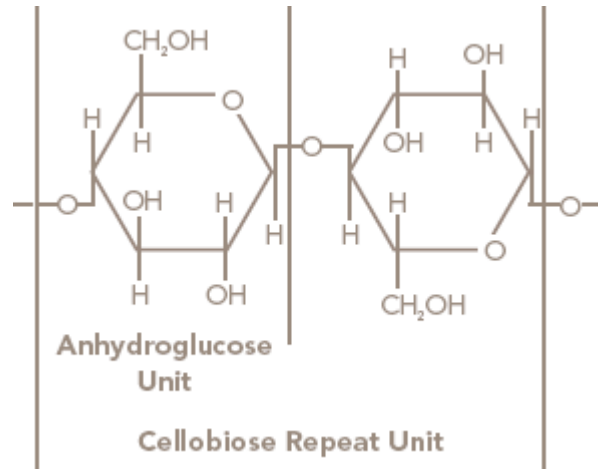
EG = ethylene glycol (ethanediol)

DMT = dimethyl terephthalate

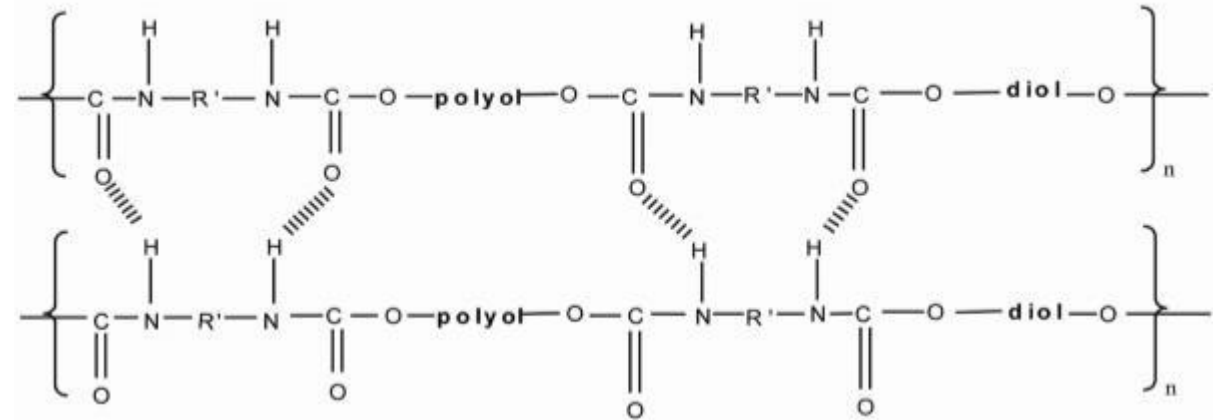
BHET = bishydroxyethyl terephthalate

PTA = purified terephthalic acid

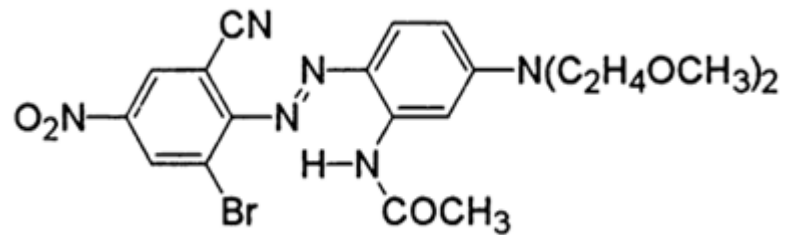
# ...But PET textiles contain many other materials



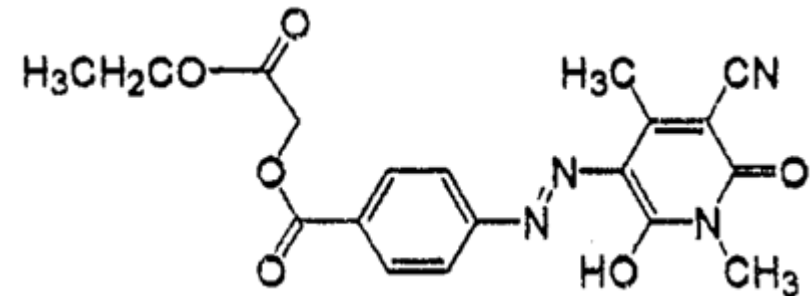
**Cotton**



**Spandex/Elastomers**



**Dispersed Blue 257**

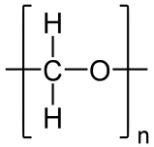


**Dispersed Yellow 221**

**Less than 80% PET by weight**

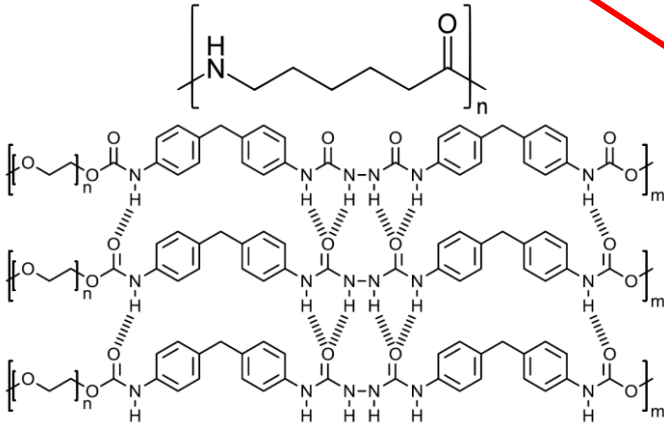
**Snaps**

*Acetal*



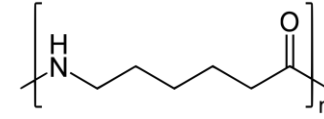
**Binding**

*Nylon & Spandex*



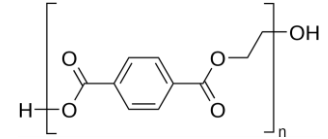
**Hanger Loop**

*Nylon*



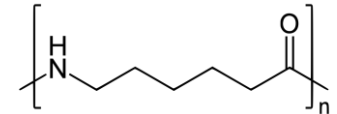
**Labels**

*PET*



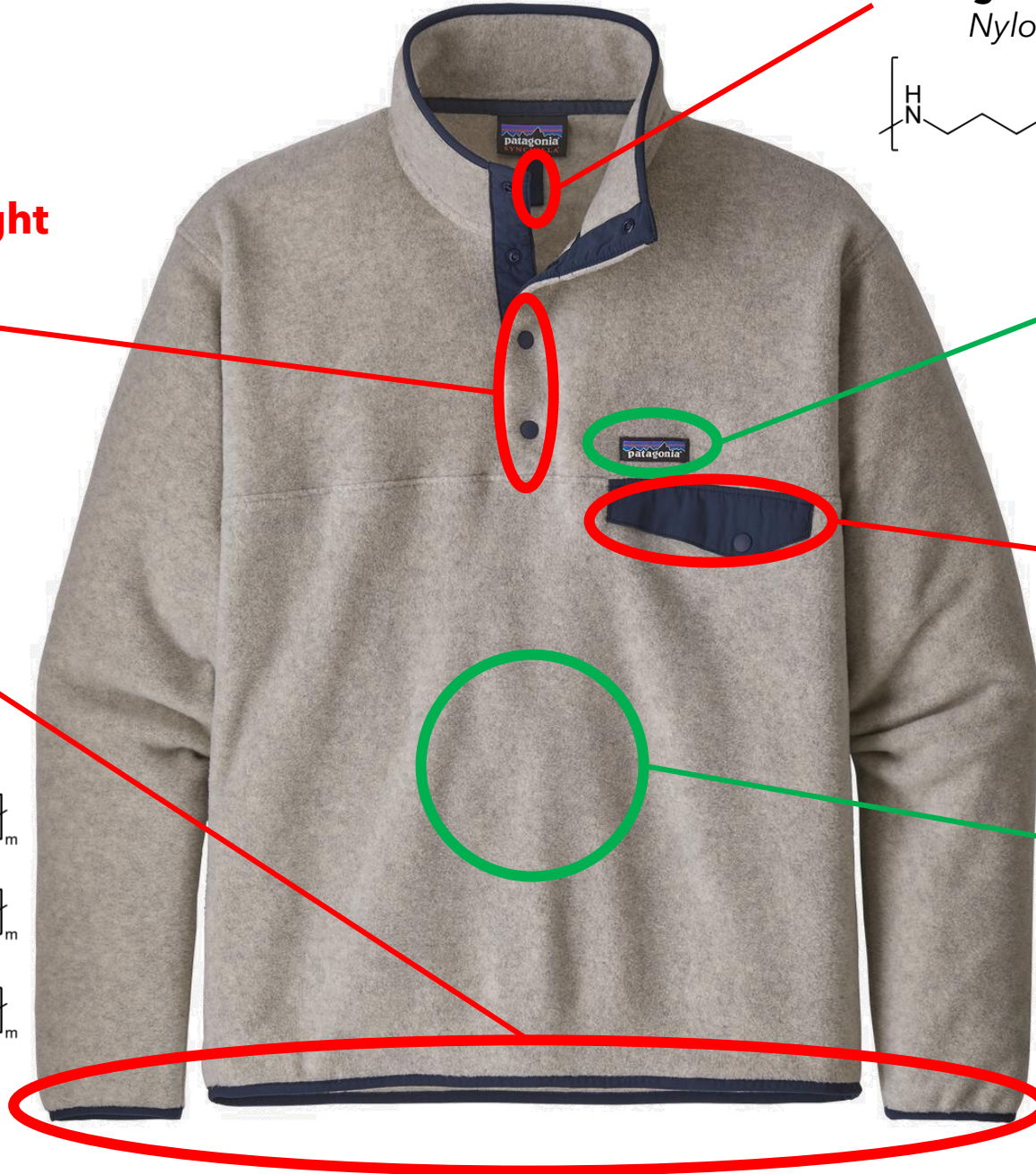
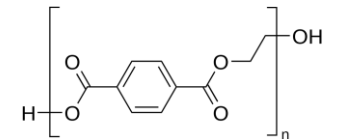
**Contrast Fabric**

*Nylon*



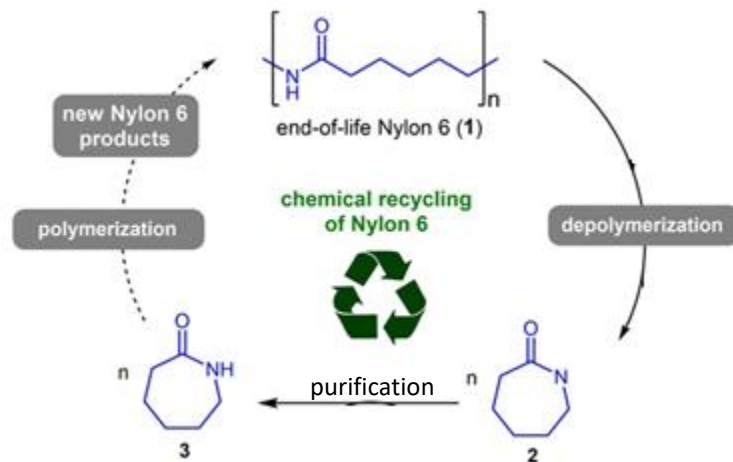
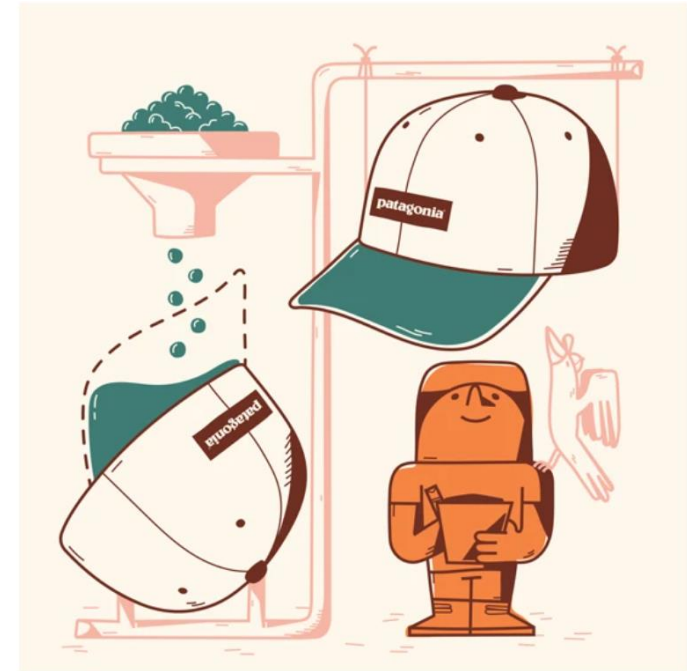
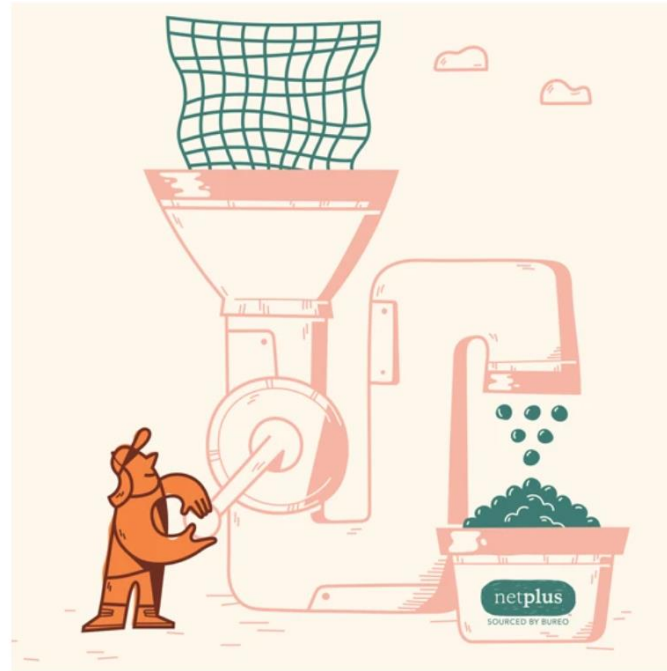
**Main Fabric**

*PET*



**Snap-T™**

# Patagonia Bureo Partnership



# Need more U.S. based recycling options



Photo Credit: Austin Siadak

- We can not continue to ship "waste" or post-consumer garments around the world.
- Need a local network to manage textile waste.

**Natalie Banakis**

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