



**FH WIENER NEUSTADT**  
**BIOTECH CAMPUS TULLN**  
– Biotechnology & Digital Future –

# Recovery Strategies for Textiles

Project Application  
Josef Ressel Center

Dr. Christian Schimper  
FHWN, Biotech Campus Tulln & Acticell GmbH

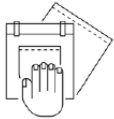
# Recovery Strategies for Textiles

## Recycling strategy of the EU: Road to 2030

- By 2030, the textile products placed on the EU market shall be



Durable



Repairable



Recyclable



Made of recycled fibers



Free of hazardous substances



# Recovery Strategies for Textiles

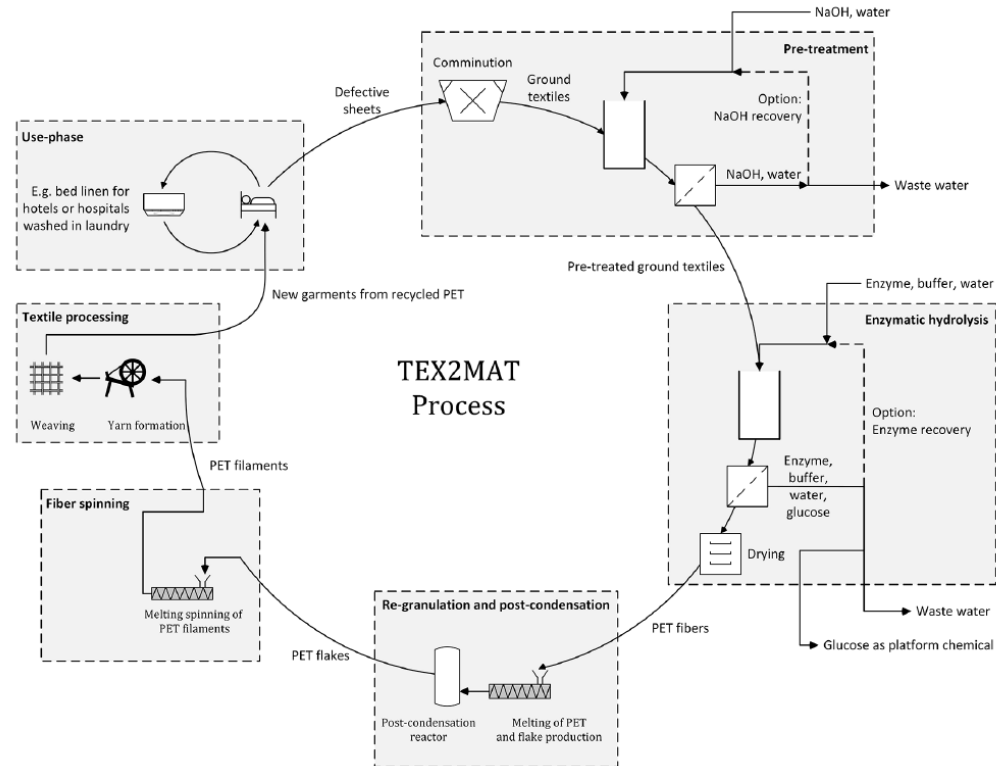
## TEX2MAT Project

- 2017-2019
- Fiber to fiber recycling of textile waste
- Enzymatic separation of CO/PET textile material (1 of 5 Case studies)
- Thermal recycling of PET
- Initiation: ECOPLUS
- Project partners
  - 3 Universities
  - 3 Textile producing companies
  - 2 Recyclers
  - 2 Plastic processors

# Recovery Strategies for Textiles



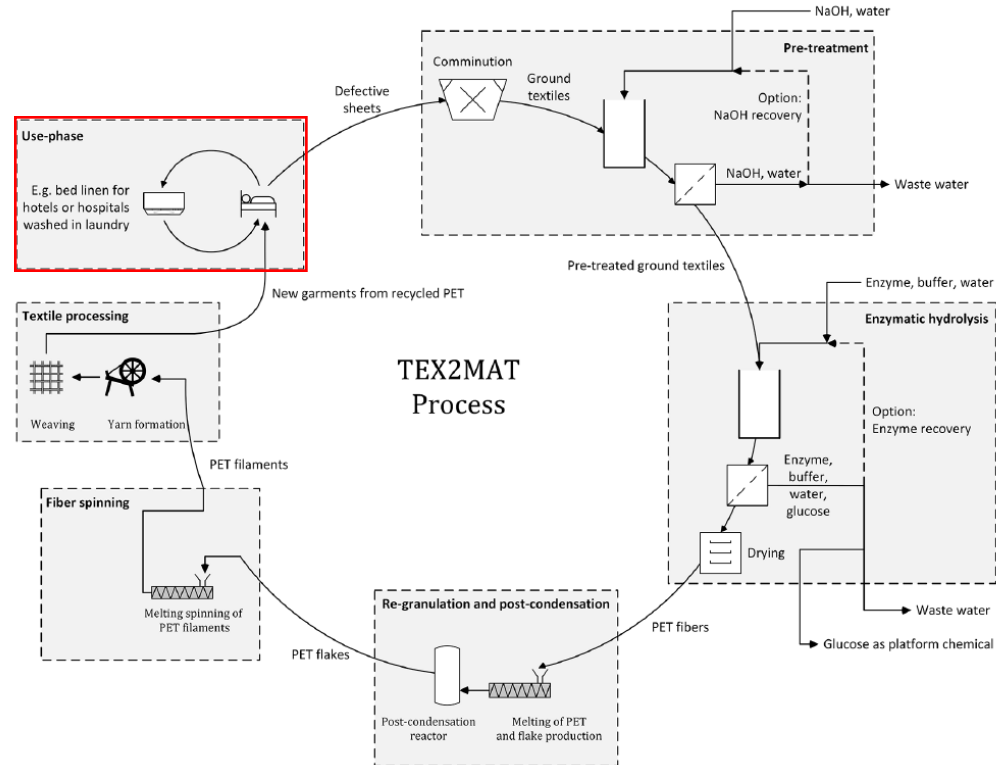
## TEX2MAT Project



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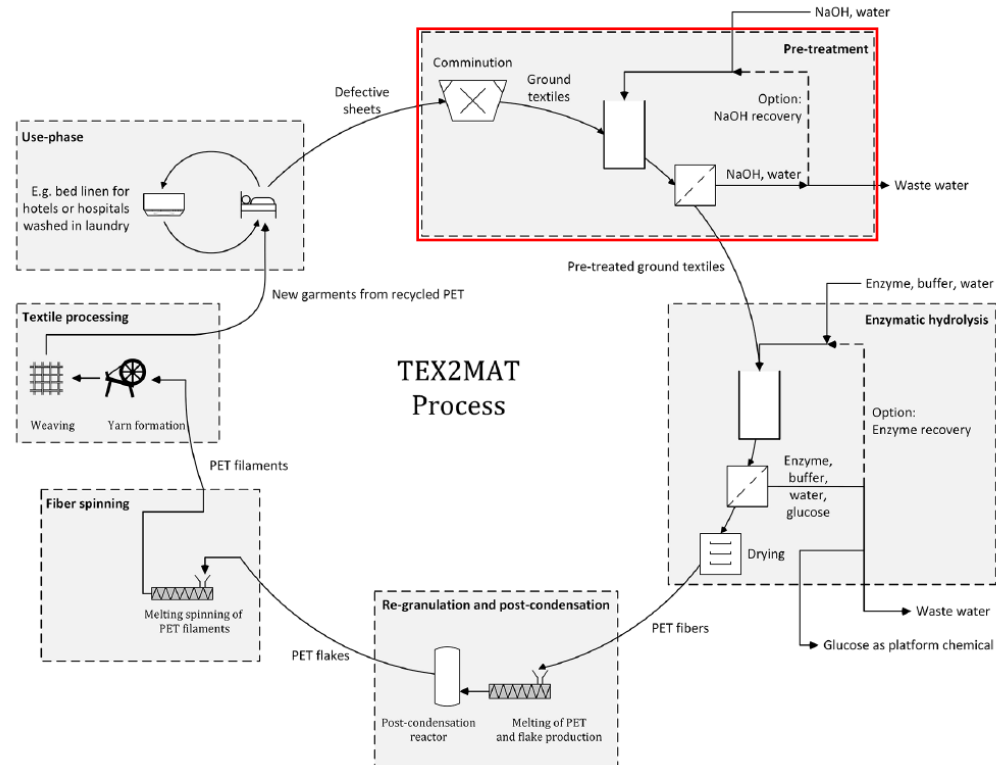


## TEX2MAT Project



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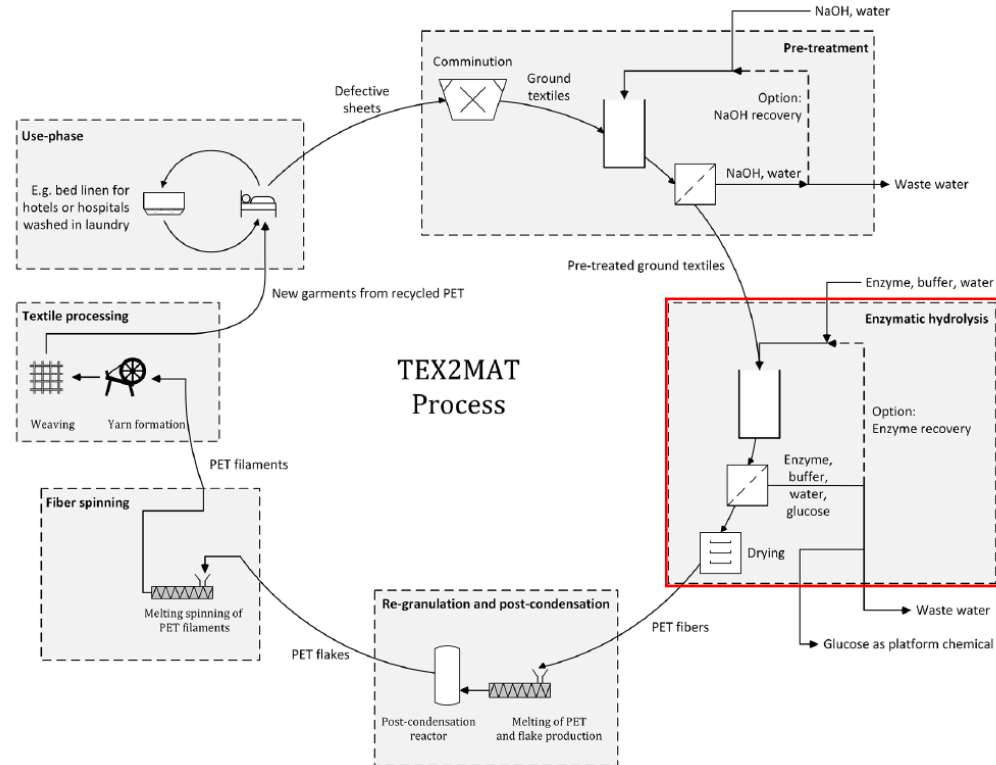
## TEX2MAT Project



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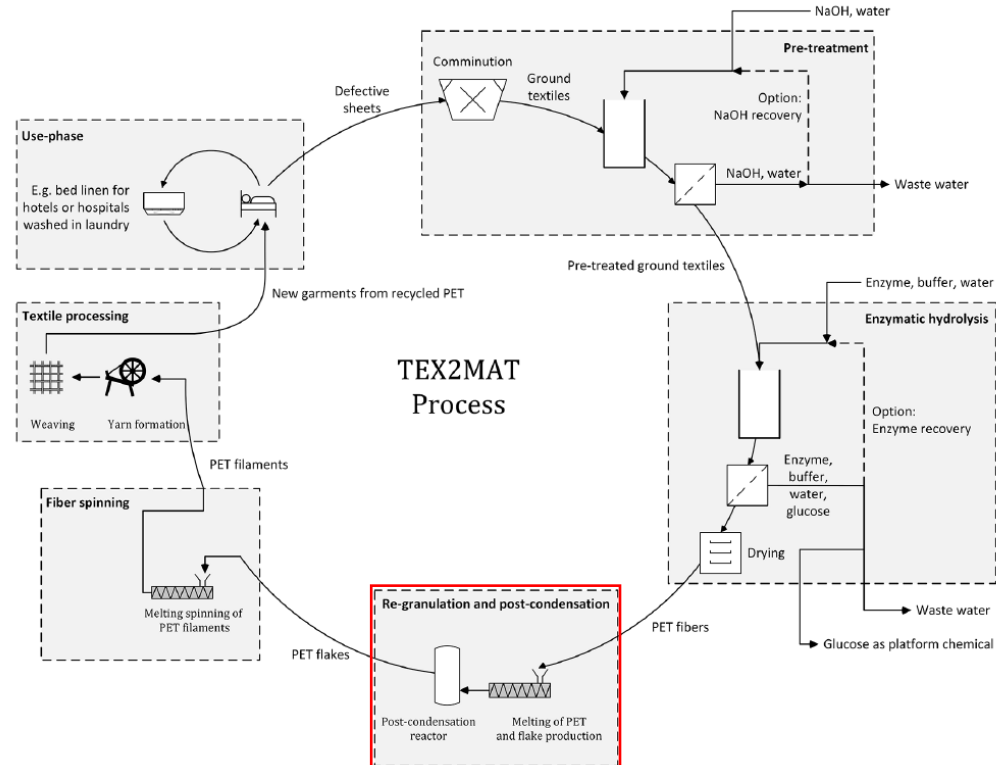
## TEX2MAT Project



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## TEX2MAT Project

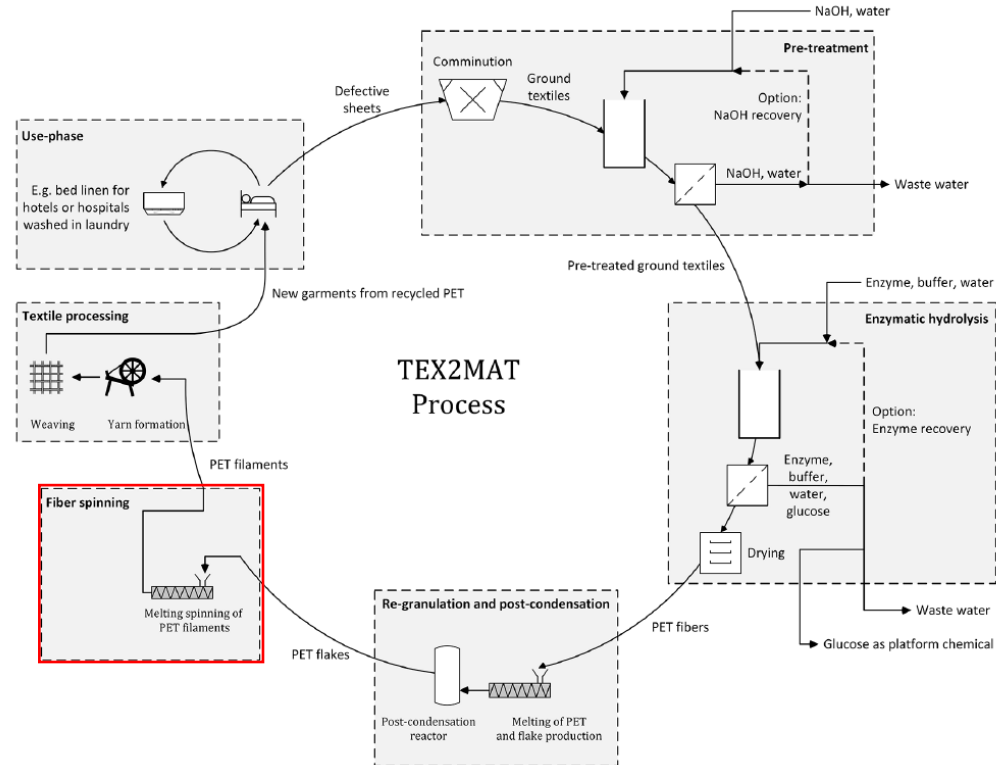




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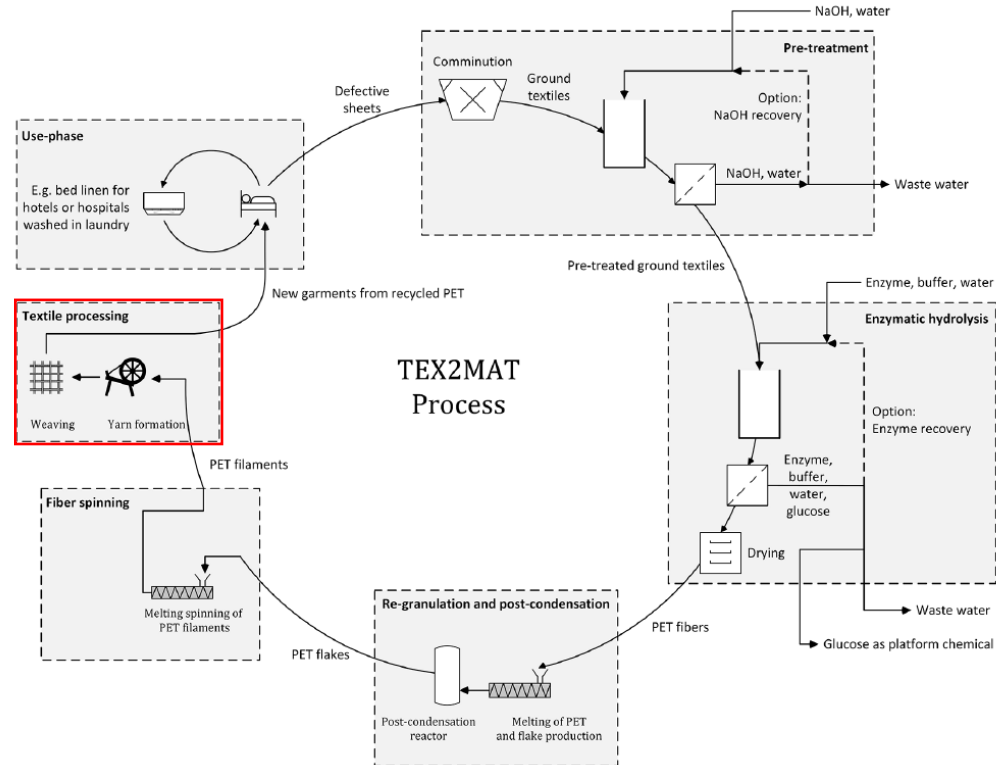


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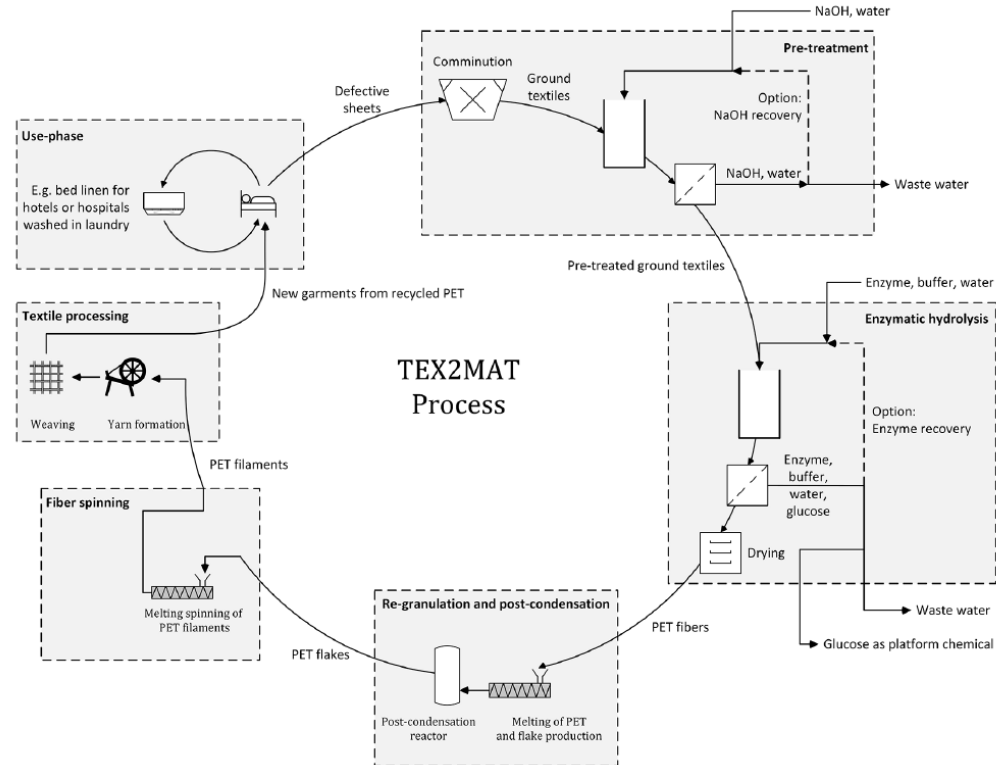
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## TEX2MAT Project



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Parameter	Maintained value
Pre-treatment	
Amount NaOH (20%)	10 l kg <sup>-1</sup> fibres*
Reaction time	1 hour
Temperature	Ambient
Enzymatic hydrolysis	
pH	5
Concentration of citrate buffer	50 mmol l <sup>-1</sup>
Hydrolysis temperature	55°C
Liquor ratio	>25 g (cellulosic) fibres* per 1 l water
Enzyme concentration	1 ml per 1 l water
Reaction time	<24 hours

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Konsortium 2022: initiated by ECOPLUS



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Salesianer MietTex GmbH

Textile Rental Services



Starlinger & Co GmbH

Recycling Machinery Provider



Erema Group GmbH

Recycling Machinery Provider



HeiQ AeonIQ GmbH

Cellulose Fiber Producer



Acticell GmbH

Textile Chemical Formulator

# Recovery Strategies for Textiles

## Josef Ressel Center Application

- Host: University of Applied Sciences Wiener Neustadt
  - Biotech Campus Tulln & Campus Wieselburg
  - Project Lead: Dr. Christian Schimper
- Technical University, Vienna
  - Institute of Chemical, Environmental and Bioscience Engineering: Prof. Andreas Bartl
- University of Natural Resources, Vienna
  - Institute of Environmental Biotechnology: Prof. Georg Gübitz
  - Institute of Chemistry of Renewable Resources: Prof. Thomas Rosenau



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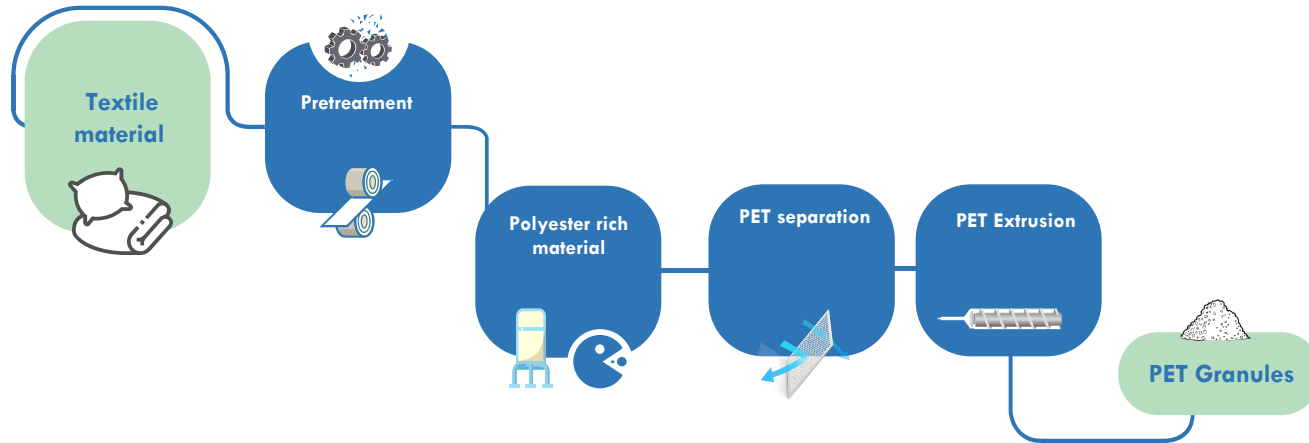


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ReSTex



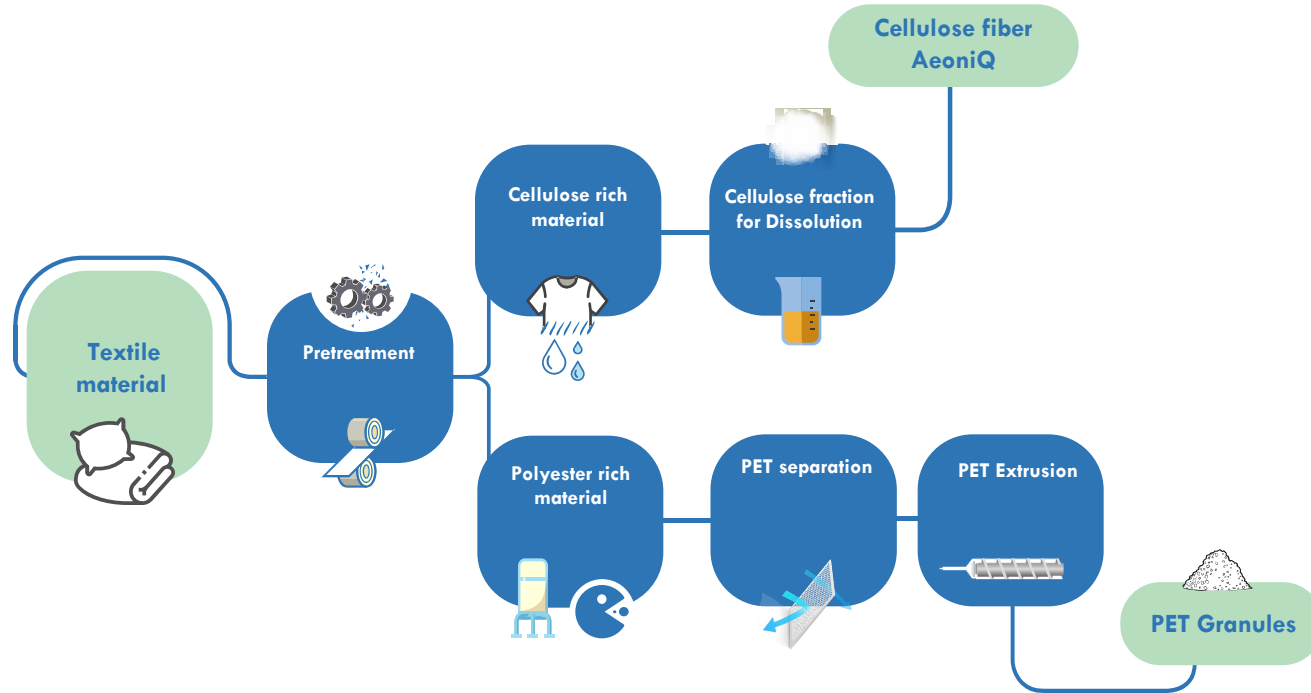
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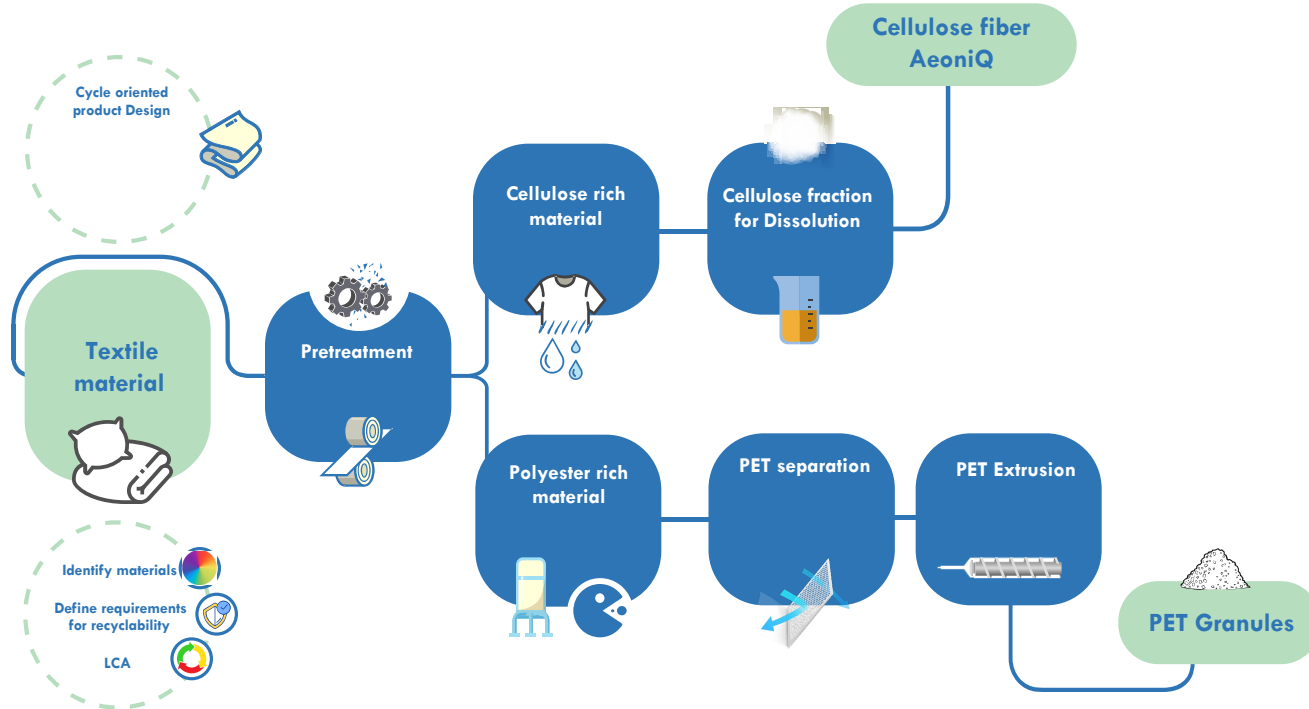
# Recovery Strategies for Textiles

ReSTex



# Recovery Strategies for Textiles

ReSTex





# Recovery Strategies for Textiles

## Challenges

- Sourcing:
  - Material availability
  - Sorting quality and quantity
- Upstream / downstream
  - Access to mechanical recycling
  - Separation of other fiber types
  - Textile dyes and auxiliaries
  - Conversion to yarns and textiles



# ReSTeX