DESIGN DRIVEN
VALUE CHAINS
IN THE **WORLD**
OF CELLULOSE
DWoC

How to convert old newspapers into textile fibers?

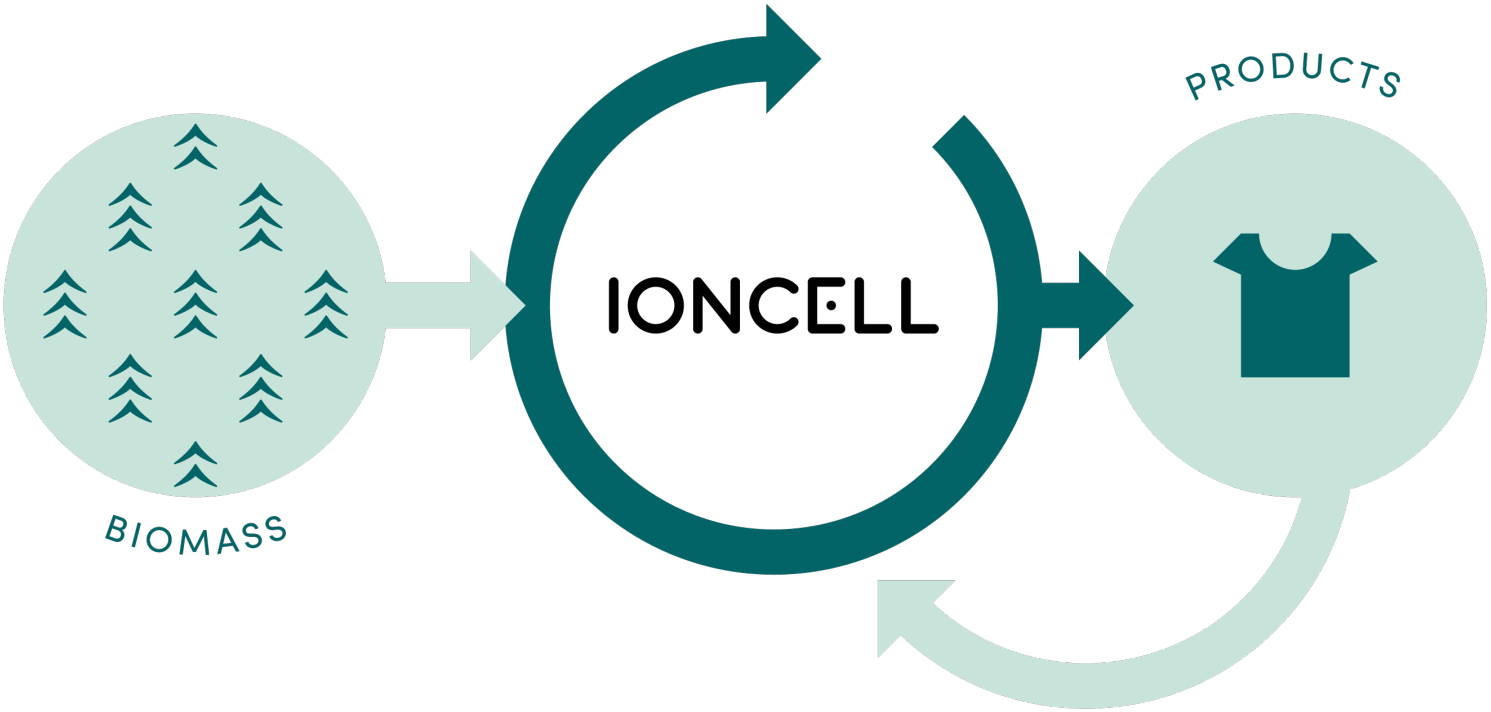
09-01-2018

Herbert Sixta

Yibo Ma

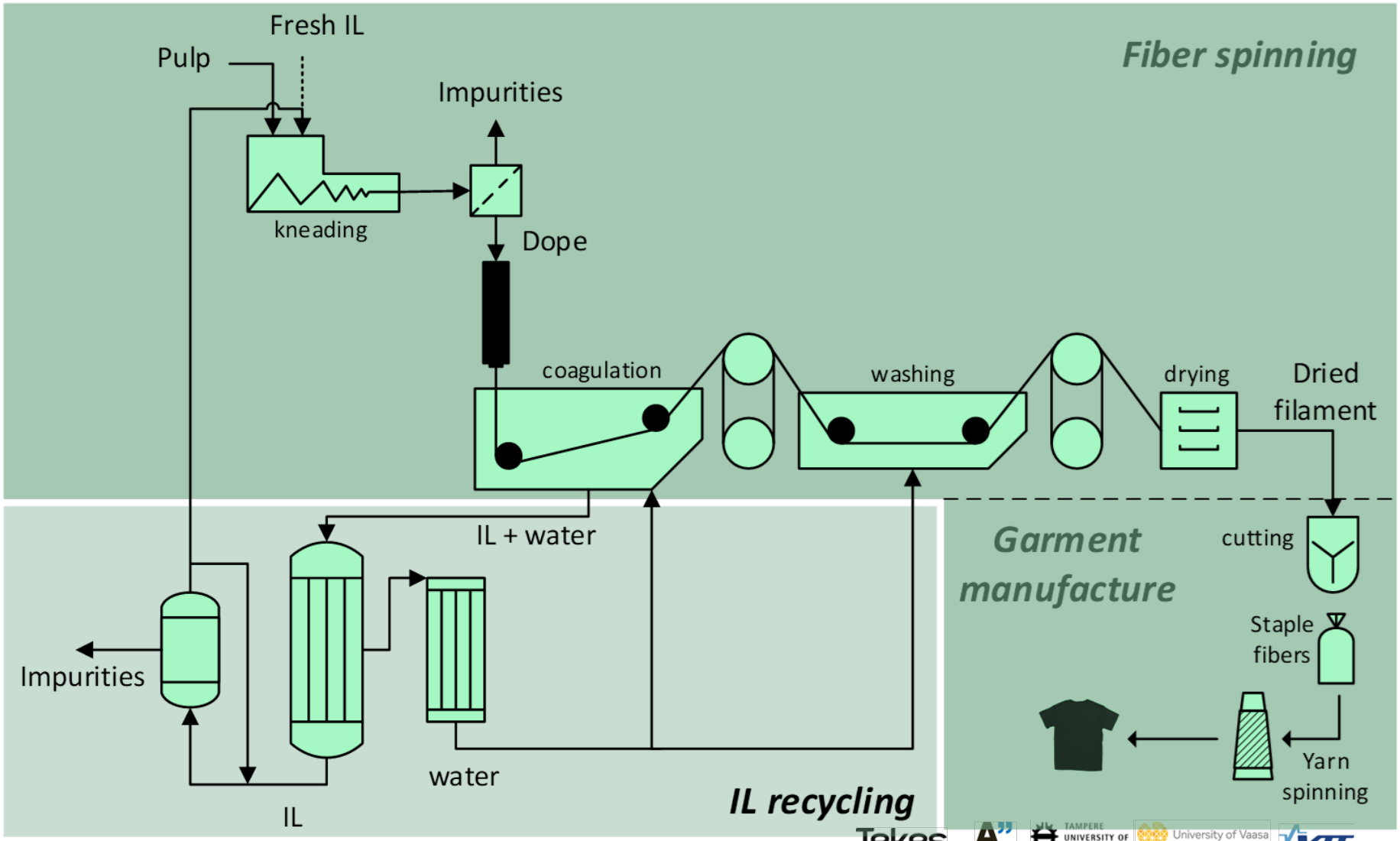
IONCELL

IONCELL: Closed-loop Operation



DESIGN DRIVEN VALUE CHAINS IN THE WORLD OF CELLULOSE DWoC

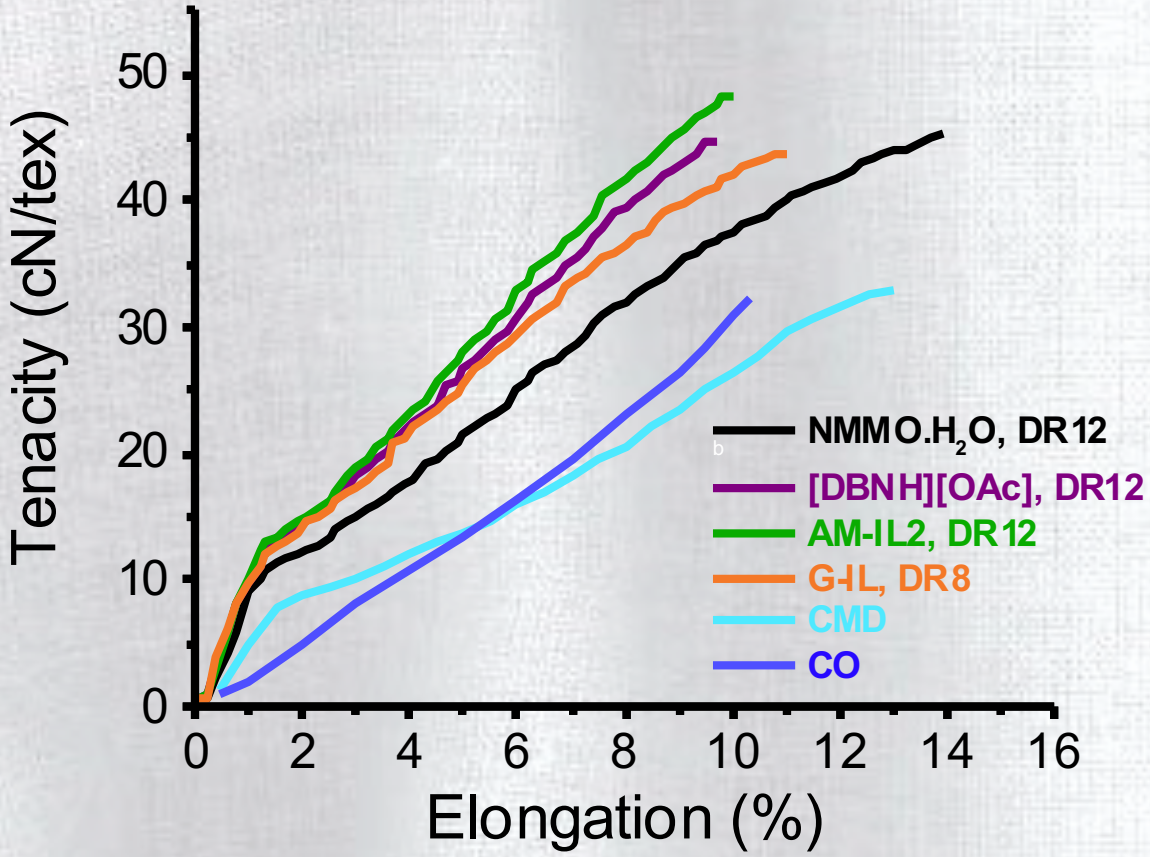
Simplicity of the Ioncell-F process



Tekes

DESIGN DRIVEN
VALUE CHAINS
IN THE **WORLD**
OF CELLULOSE
DWoC

Ioncell fibers



Master thesis: Kadvaël Le Boulch 2016

Tekes · Aalto University · Tampere University of Technology · University of Vaasa · VTT

DESIGN DRIVEN VALUE CHAINS IN THE WORLD OF CELLULOSE DWoC

Environmental aspects

Eco-toxicity

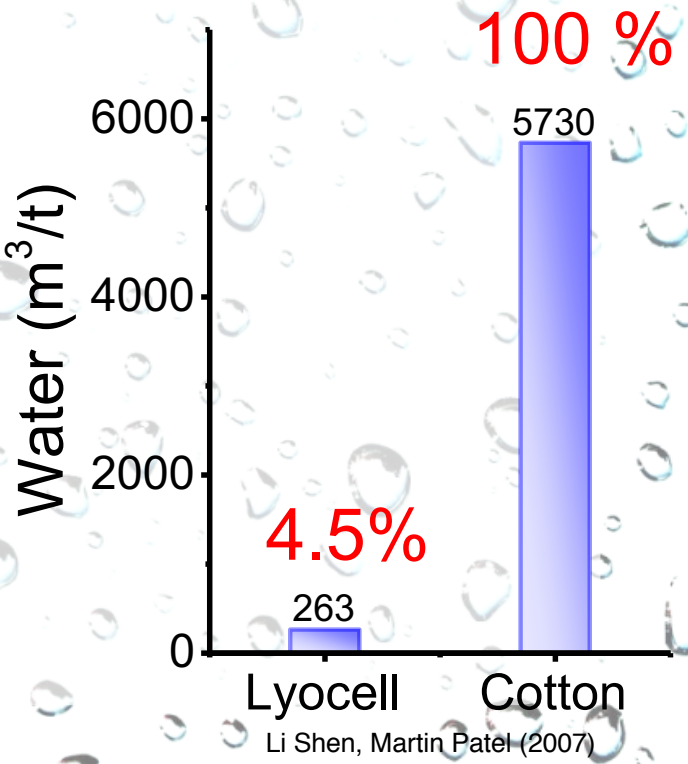
EC_{50} [mg/L)]	[DBNH][OAc]
Vibrio fischeri, 5 min	**4 678**
Vibrio fischeri, 15 min	**3 257**
HCE, mammal	**12 912**

EC_{50}

Highly toxic: **< 1.0 mg/L**
Toxic: **1 – 10 mg/L**
Moderately toxic: **10 – 100 mg/L**
Mildly toxic: **100 – 1000 mg/L**
Non-toxic: **>1000 mg/L**

Susanne Wiedmer, University of Helsinki (2016)

Water consumption



Li Shen, Martin Patel (2007)

Tekes

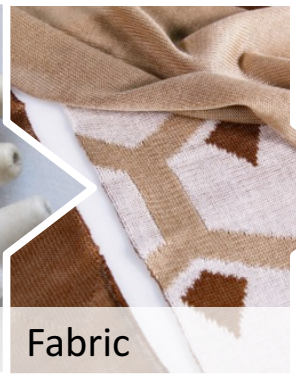
EUROPEAN PAPER RECYCLING AWARDS 2015

Paper/Board

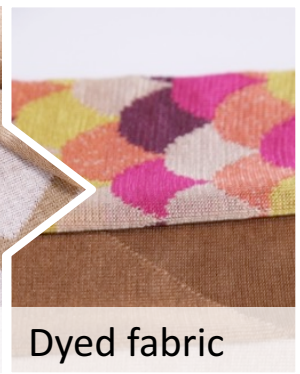
Pulp

Fiber

Yarn



Fabric

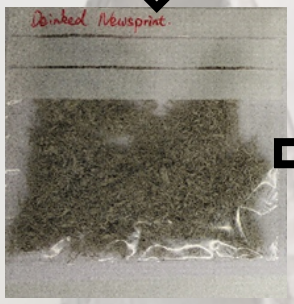


Dyed fabric

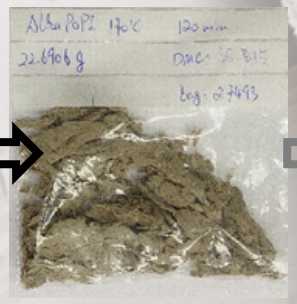
Tekes · Aalto University · Tampere University of Technology · University of Vaasa · VTT

DESIGN DRIVEN
VALUE CHAINS
IN THE **WORLD**
OF CELLULOSE
DWoC

Waste Newsprint to Textile Fibers

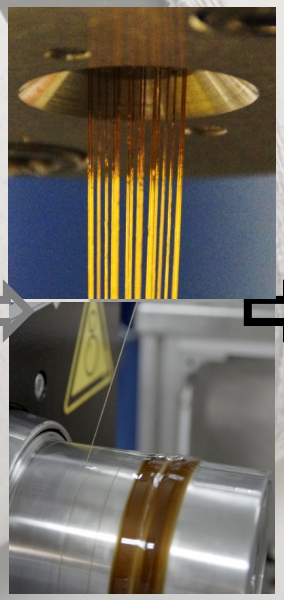


Deinked Newsprint

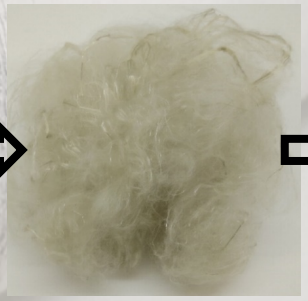


Mild Pretreatment

Dope



Spinning

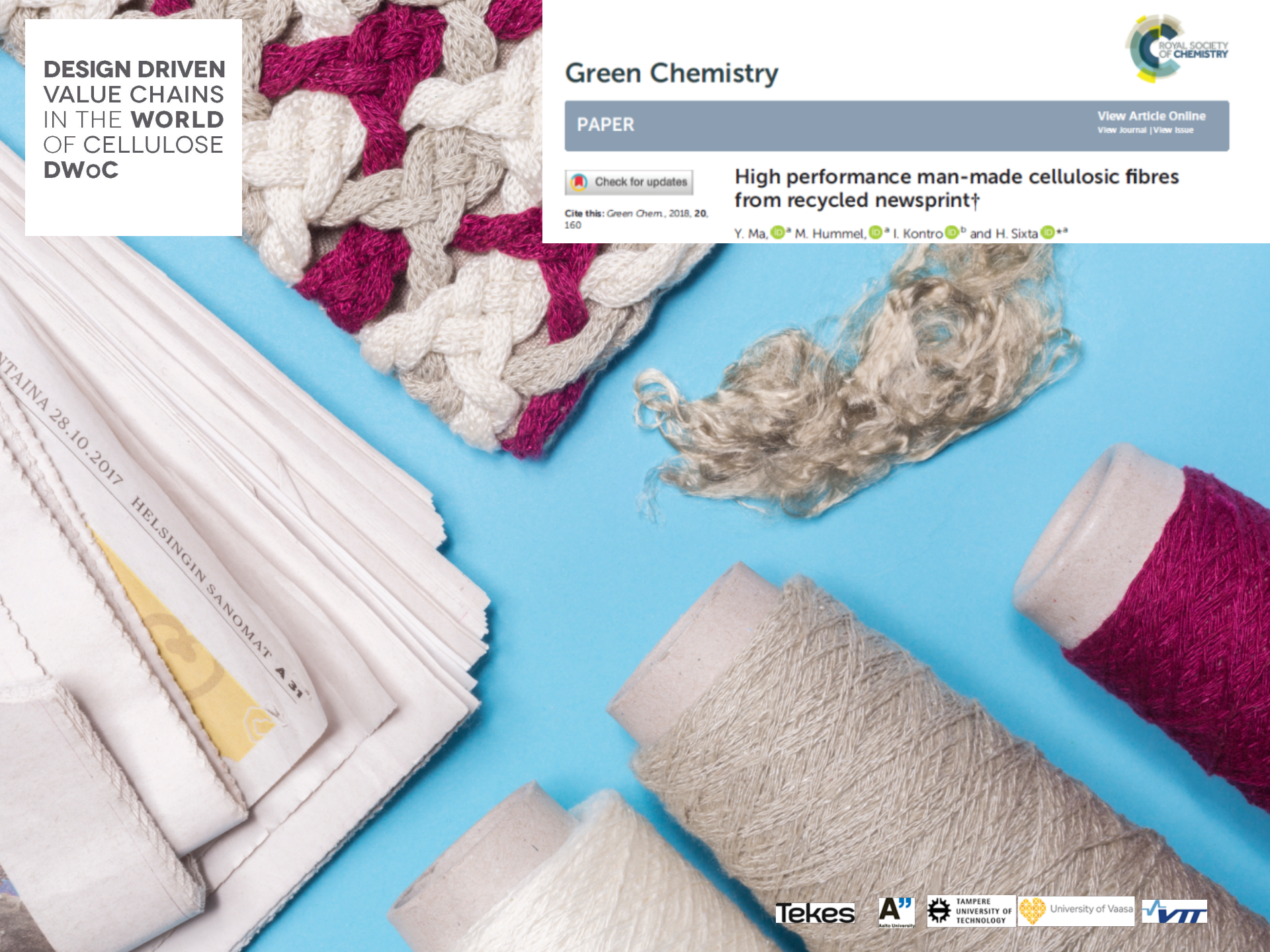


Staple fiber

Yarn

Tekes

DESIGN DRIVEN
VALUE CHAINS
IN THE **WORLD**
OF CELLULOSE
DWoC



Green Chemistry

PAPER

View Article Online
View Journal | View Issue

Check for updates

Cite this: *Green Chem.*, 2018, **20**, 160

High performance man-made cellulosic fibres from recycled newsprint†

Y. Ma, [a] M. Hummel, [a] I. Kontro [b] and H. Sixta *[a]

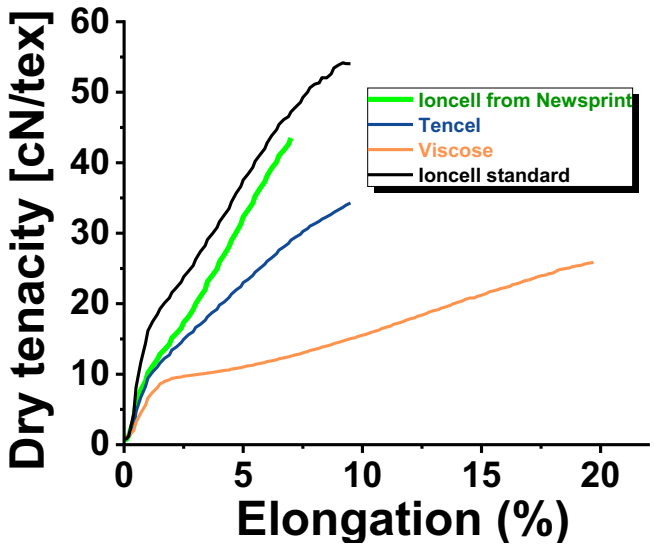
Tekes · Aalto University · Tampere University of Technology · University of Vaasa · VTT

loncell fibers from newsprint in numbers

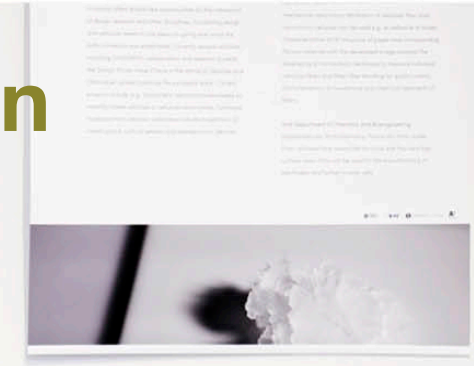
60% yield

74% Cellulose
21% Hemicellulose
5% Lignin

DR_{max} = 18
Titer = 0.8 dtex
T_c = 44 cN/tex
$T_w:T_c$ = 0.85
ε_C = 8%



Industrial collaboration



Acknowledgement

Anna

Yibo Marjaana Michael

marimekko

H&M

IKEA

rethink.

storaenso

FINARTE

KERING

GUCCI PUMA

Metsä

ANDRITZ

Tekes

Aalto University

TAMPERE UNIVERSITY OF TECHNOLOGY

University of Vaasa

VTT