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Ph.D. thesis (2023-2026)
LGP2 (J.Bras)
SIMAP (E.Blanquet) / CILKOA

Atomic Layer Deposition (ALD) optimization into cellulosic substrate for barrier properties

Optimisation du traitement ALD sur supports cellulés

MatBio

Thèse confidentielle

Context / Objectives

New legislation on plastic packaging

Reduce Reuse Recycle

- Single Use Plastics Directive (2019)
- Packaging and Packaging Waste Regulation (2018)

Green alternative

Cellulosic materials

Abundant, Recyclable, Biodegradable & Renewable

Permeable, Low barrier & Hydrophilic

CILKOA

Develop an innovative hydrophobic barrier treatment for cellulose substrates with few nanometers of ceramic

Objectives

- Study the influence of substrate density, roughness and chemistry on ALD deposition
- Study adhesion of different layers
- Determine converting resilience for specific applications

Funded by:

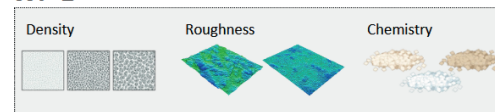


cilkoa
The barrier solution for paper packaging

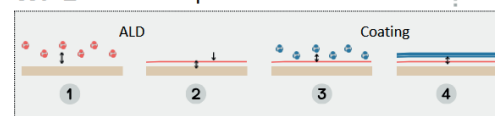
In collaboration with

Methods

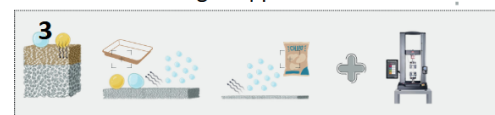
WP 1 Influence of cellulosic structures



WP 2 Adhesion phenomena



WP Converting & Applications



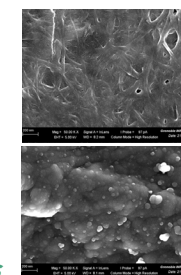
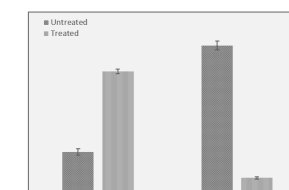
Characterizations

Properties: Water Vapor, Water, Oxygen, Fire resistency...

Ellipsometry, X-Ray Fluorescence, ICP-MS, SEM-FEG, AFM...

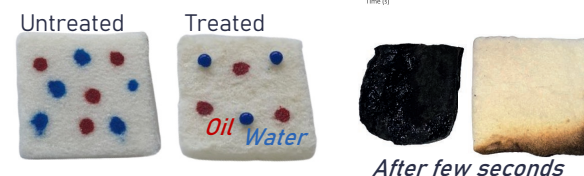
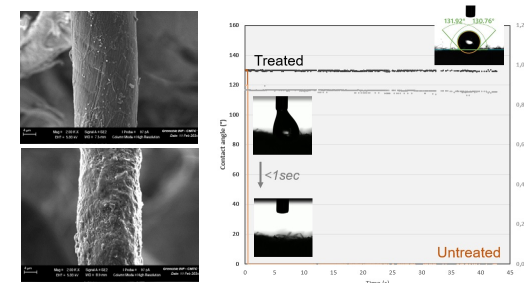
Results

On paper...



Good barrier properties

On foam...



Hydrophobic, Selective absorption & Fire retardant