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 Ph.D. thesis (2022-2025)
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Thèse confidentielle

Modification of the properties of polymer surfaces by an environmentally friendly printable coating

Modification des propriétés de surfaces polymères par un vernis imprimable respectueux de l'environnement

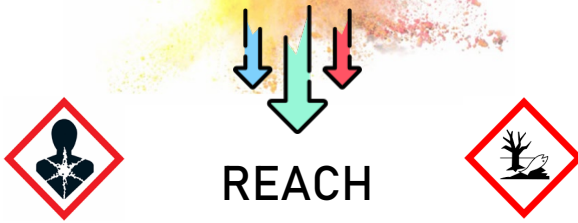
Context / Objectives

Coatings industry – Textile field

Textile personalization

- Demand used to grow up the last decade
- Customers always want new design in every area
- Clothing manufacturers are looking for new solutions

Printable coating offer an unlimited way of personalization



Use of a lot of dangerous products for both human health and environment

Objectives : Create a new coating that respect :

- the same requirements and industrial constraints
- the environment, labels, laws and human health

Funded by:

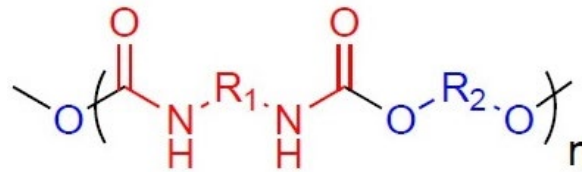


CHOMARAT

In collaboration with Chomarats Textiles Industries

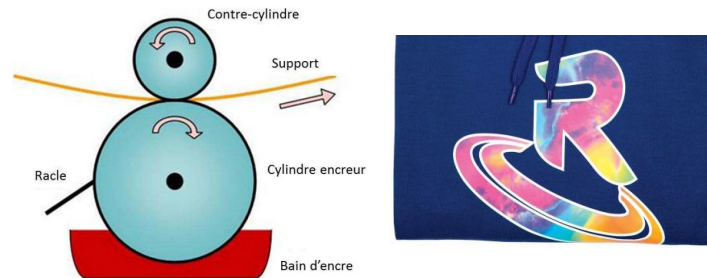
Methods

Formulation with polymer and additives



Rotogravure/reverse coating

Transfert with heat and pressure on textile



Printing by inkjet

Surface/interface/interphase characterizations

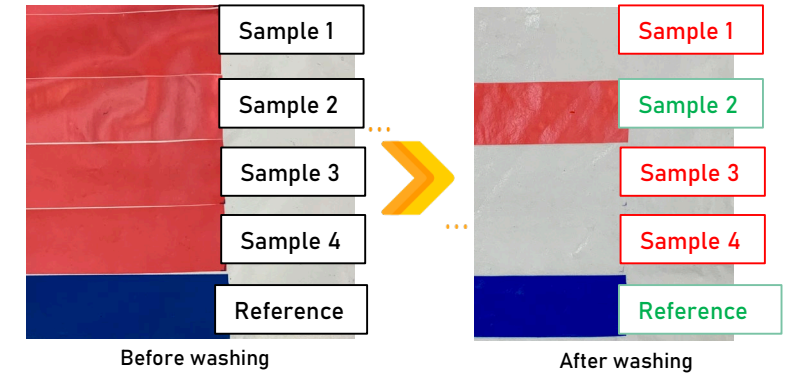
- Contact angle measurements
- Washing test
- Mechanical properties
- X-Ray photoelectron spectrometry



Results

Washing test

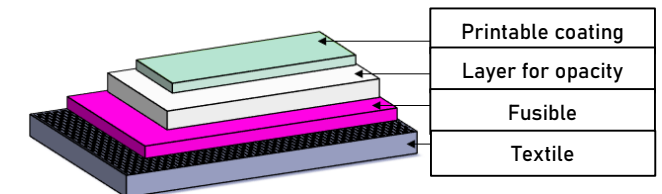
- Selection of CMR-free products that resist to the washing test (main requirement)



- Delamination of the coating from the textile : **KO**

Why does a coating works and resist the washing test ?

- Contact angle measurements proved that it not related to polarity
- Next step : another theory of adhesion, the diffusion



Carte contexte/objectifs :

Triple flèche : https://www.flaticon.com/fr/icone-gratuite/fleches-vers-le-bas_7017780?term=fl%C3%A8che&page=1&position=34&origin=search&related_id=7017780

Cadre méthodes :

Sweat : <https://www.chemica.fr/fr/100-hotmarkprint-revolution.html>

Molécule : <https://ramenetessciences.wordpress.com/2017/05/05/le-polyurethane-pu/>

Process enduction : « Etude et optimisation de l'imprimabilité de films PVC produits par calandrage et enduction », Romain MAGNIER, 2015

Arbre coloré : <https://pixers.fr/posters/l-39-arbre-abstrait-arriere-plan-colore-43322679>

Cadre résultats :

Photo d'échantillons : prise avec mon téléphone, en PJ du mail

Flèche orange : https://www.flaticon.com/fr/icone-gratuite/fleche-droite_556670?term=fl%C3%A8che&page=1&position=31&origin=search&related_id=556670