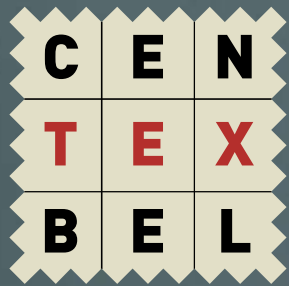


Applications sol-gel sur textile

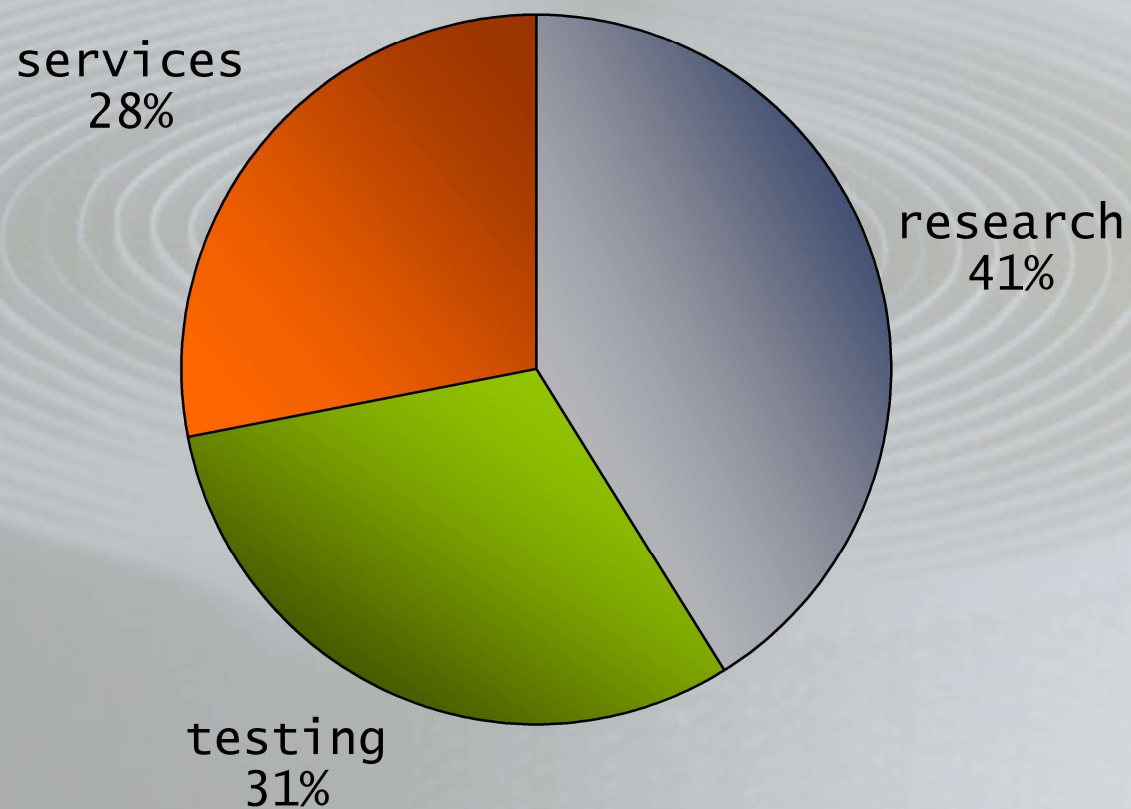
Kristof Stevens
Centexbel

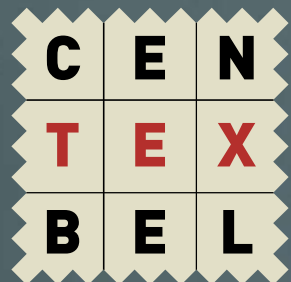
L'esprit créatif du textile Européen
16 octobre 2009



Centre de compétences

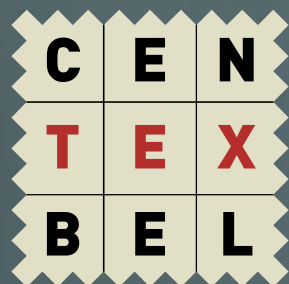
- centre collectif qui associe :
 - 800 producteurs Belges du textile
 - Plus de 100 compagnies et organisations nationales et internationales coopérant librement
- Effectif permanent
 - 120 personnes qualifiées





Services

- Consulting (environmental, technology, management,...)
- Training
- Certification
- Standardisation
- Seminaires
- ...



Testing



ISO 17025 accrédité

- laboratoire physique
- laboratoire chimique
- laboratoire microbiologique
- laboratoire feu

Centexbel est reconnu par

- Grands distributeurs
- Associations des consommateurs
- OEM's (Original Equipment Manufacturers)



Coating and finishing

- hotmelt
- Plasma
- UV
- smart textiles
- ...



Matériau Textile

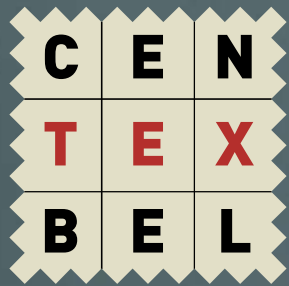
- fil bicomposant
- Bio-polymères
- matériaux nano
- composites
- ...



Health, safety

- and security
- textiles médicaux
- ergonomie
- ...

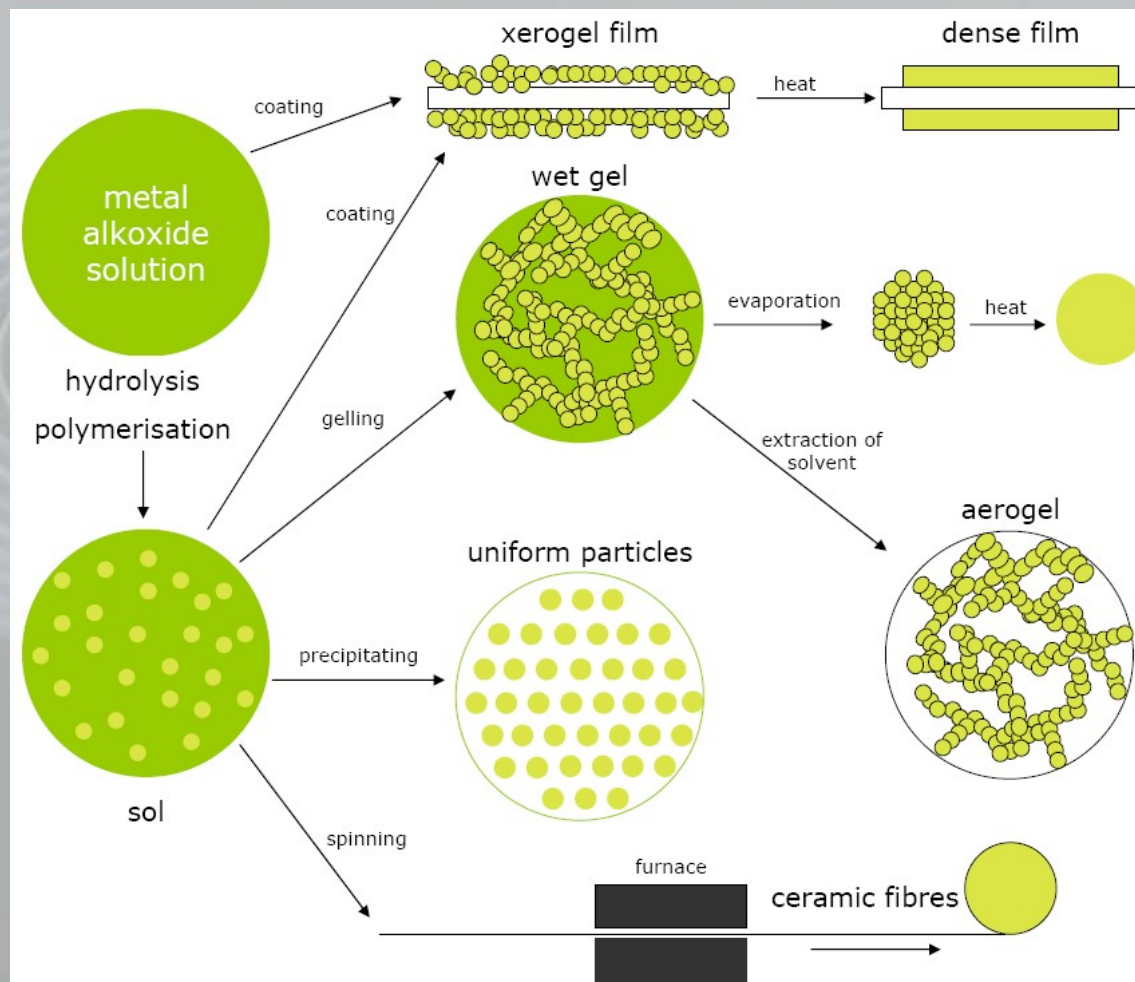




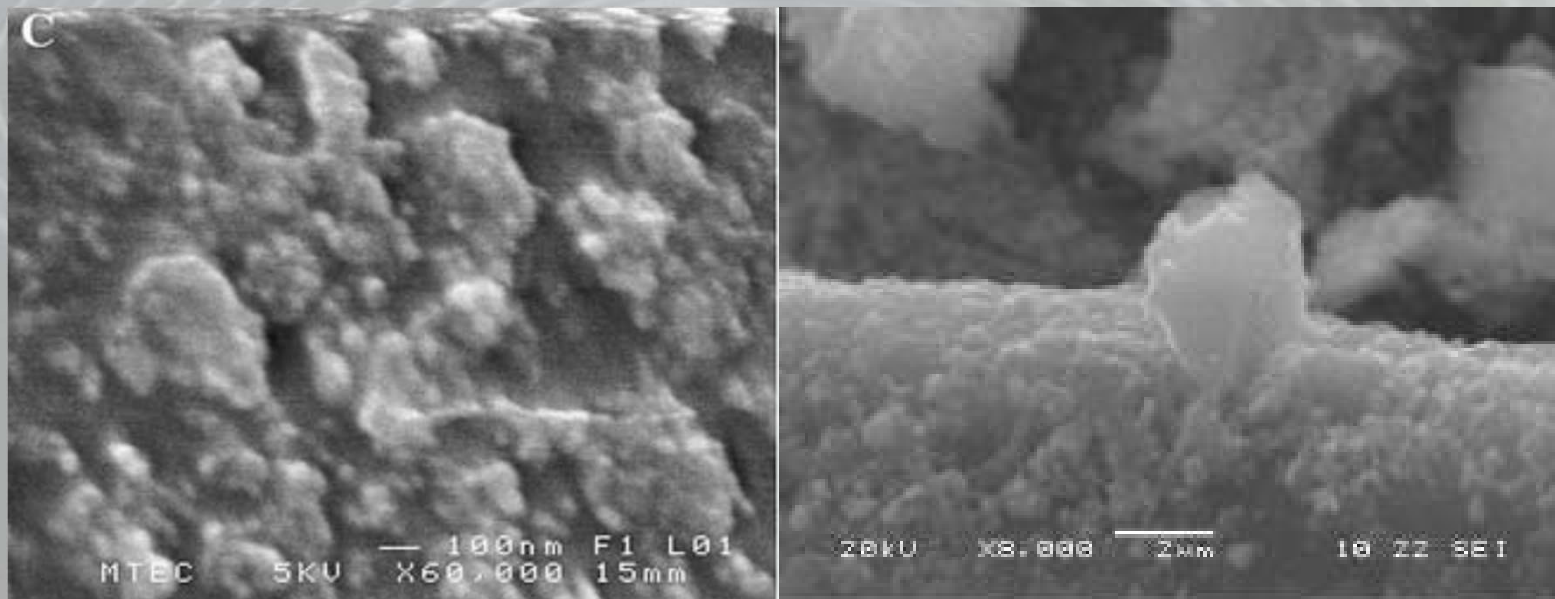
Sol-gel: c'est quoi?

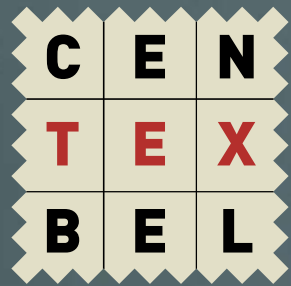
- Sol=Solution colloïdale d'oxydes métalliques
- Gel=Phase produite après évaporation du solvant
- Souvent produit à partir des alkoxydes métalliques
- Éléments utilisés: V, Ti, Si, Al,...

Processing du sol-gel



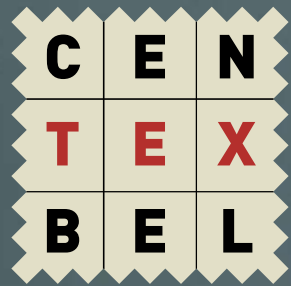
- Dur (able): Si-O-Si
- Surface nano-poreuse





Propriétés

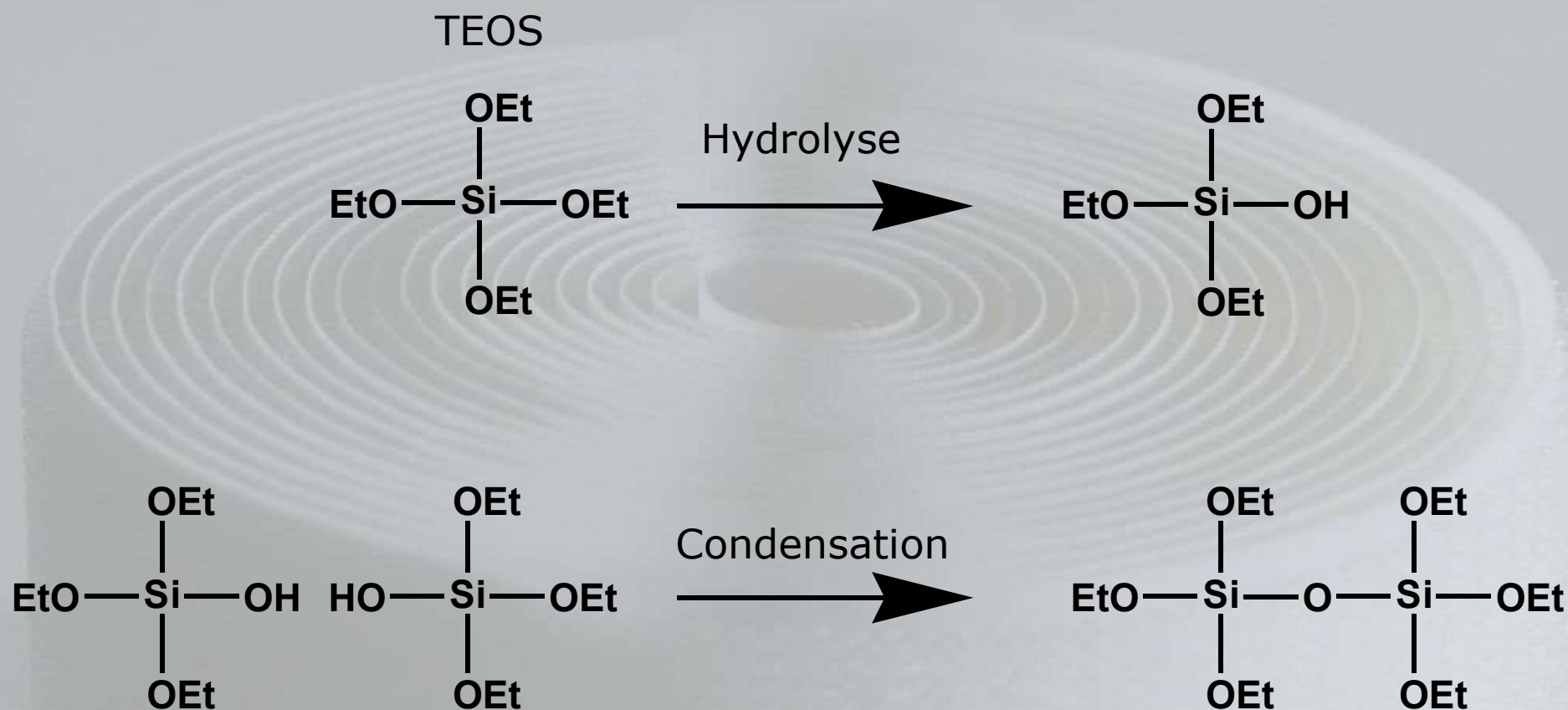
- Dur (able): Si-O-Si
- Surface nano-poreuse
- Epaisseur: $\sim 100\text{nm}$
- Facile à fonctionaliser (omniphobicité, UV-protection, antimicrobien,...)



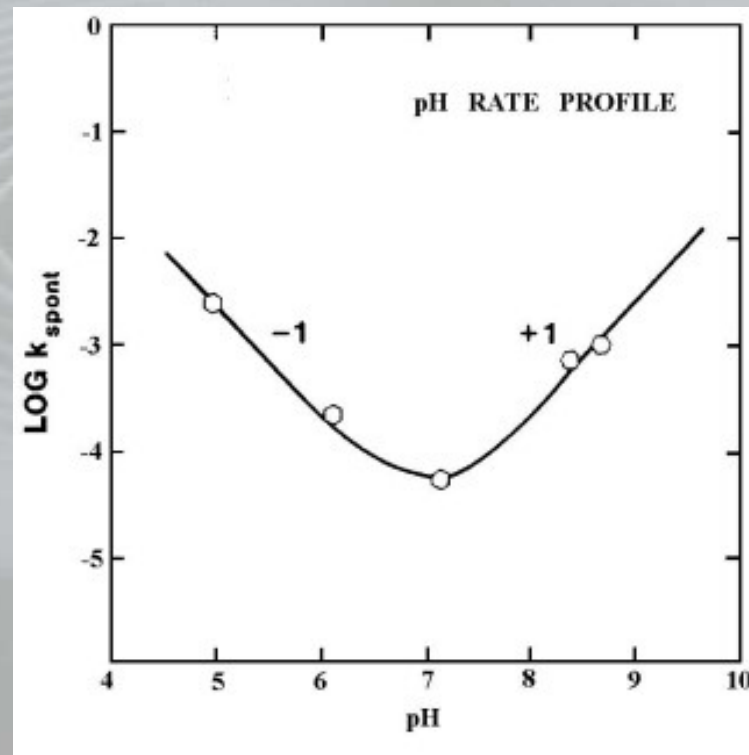
technologie

- Coatings minces (optique, lentilles)
- Protection des bâtiments
- Production de fibres optiques
- Poudres céramiques
- Zéolites
- Aérogels
- ...

Chimie du sol-gel



Hydrolyse



- Hydrolyse
- Condensation

- Acid-catalyzed

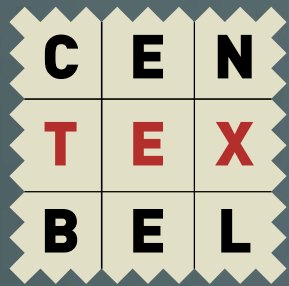
- yield primarily linear or randomly branched polymer



- Base-catalyzed

- yield highly branched clusters





Application sur textiles: défis

- Solvants organiques
- Températures élevées
- pH bas
- Durable

→ Comment appliquer sur textile?



TEOS + GPTMS + additives



Structure de base

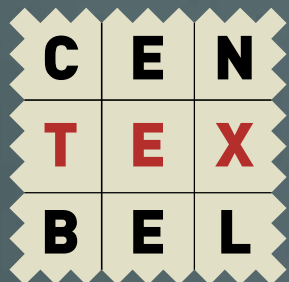


Adhésion + flexibilité



Fonctionalisation

→ Curing à 150°C



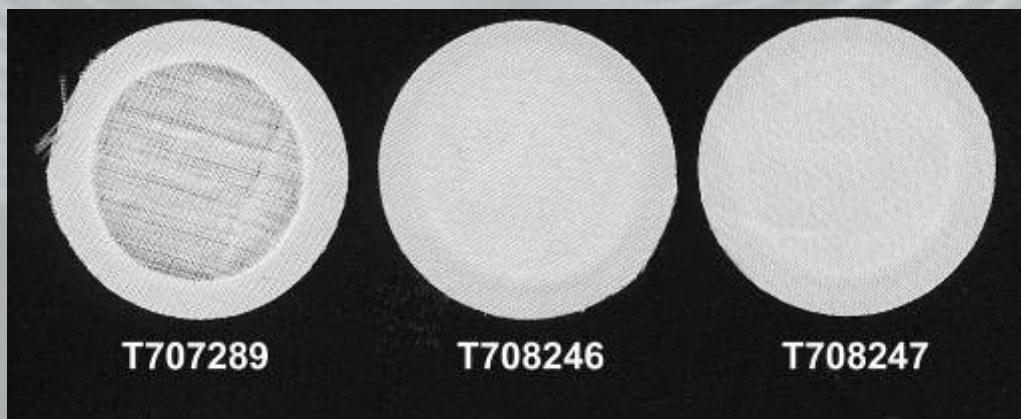
Résultats: Abrasion

Test selon norme EN ISO12947 (part 2)

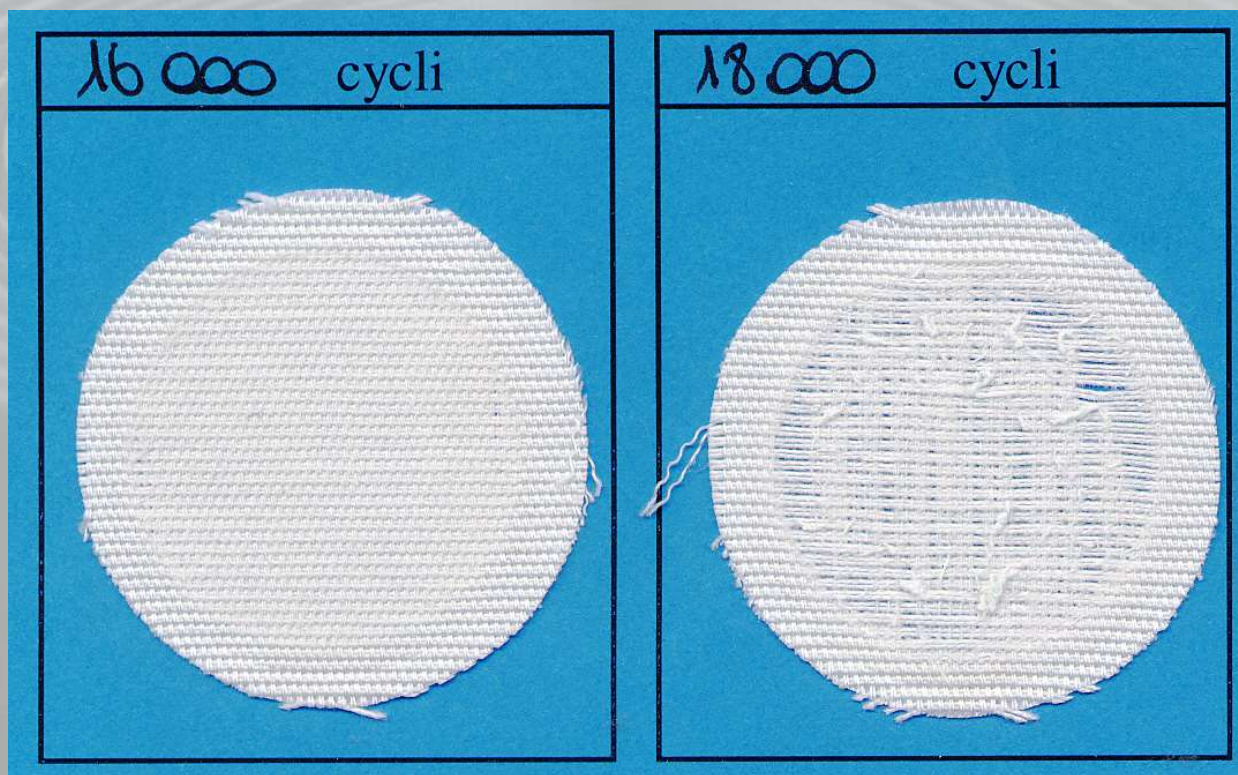
PES après 100000 tours:

T707289: référence

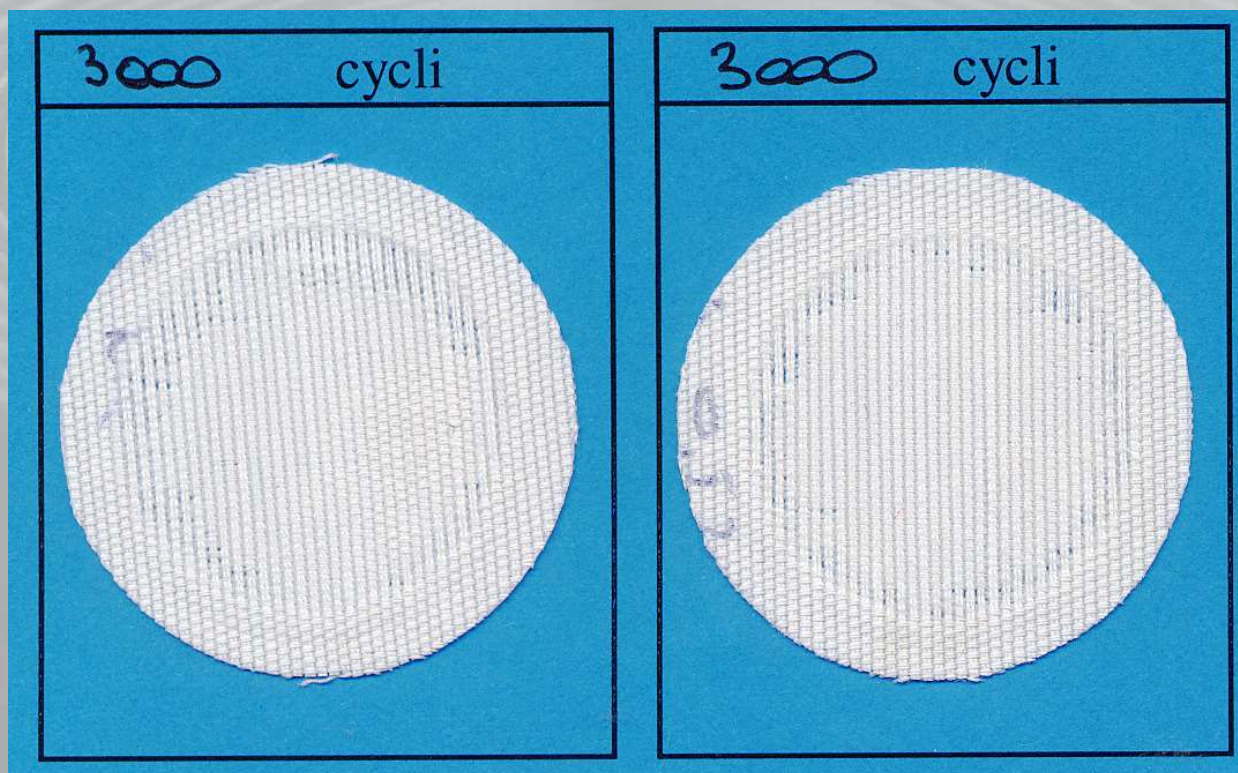
T708246 et 7: traité avec un finish sol-gel

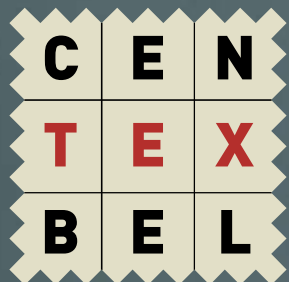


Test selon norme EN ISO 12947 (part 2) COTON



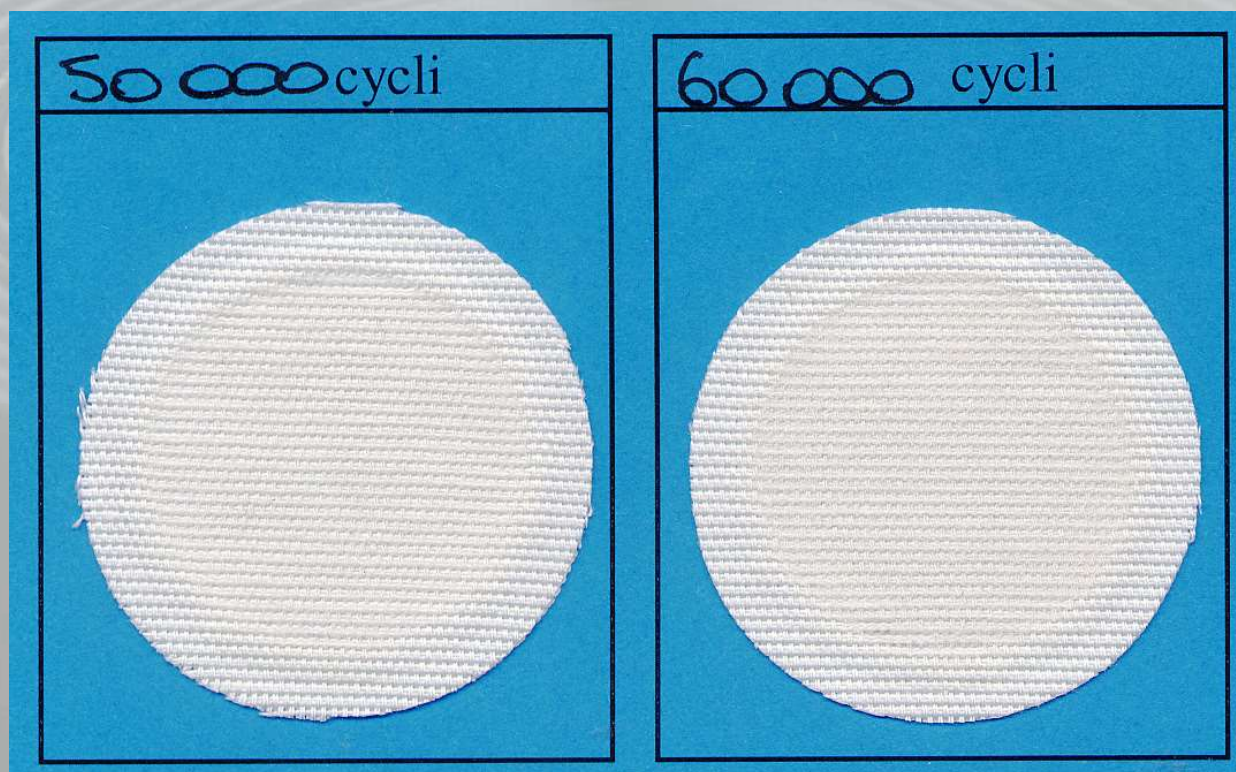
Test selon norme EN ISO 12947 (part 2) COTON





Résultats: Abrasion

Test selon norme EN ISO 12947 (part 2) COTON

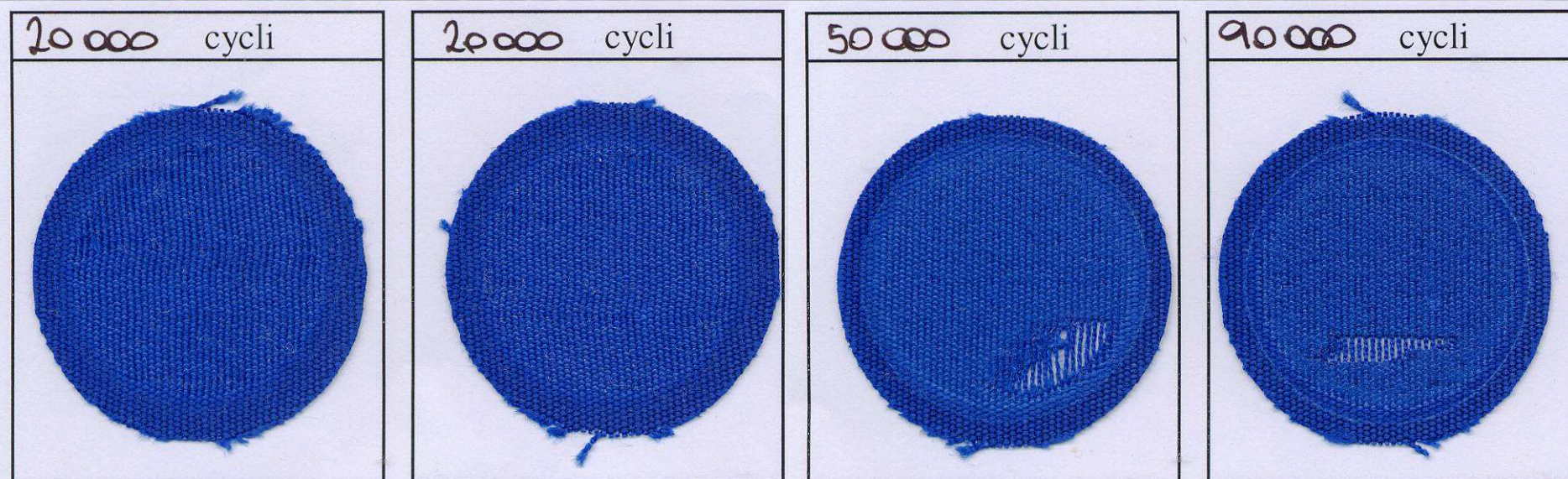


- Test selon norme EN ISO 12947 (part 2)

Polypropylène

Référence

Traité

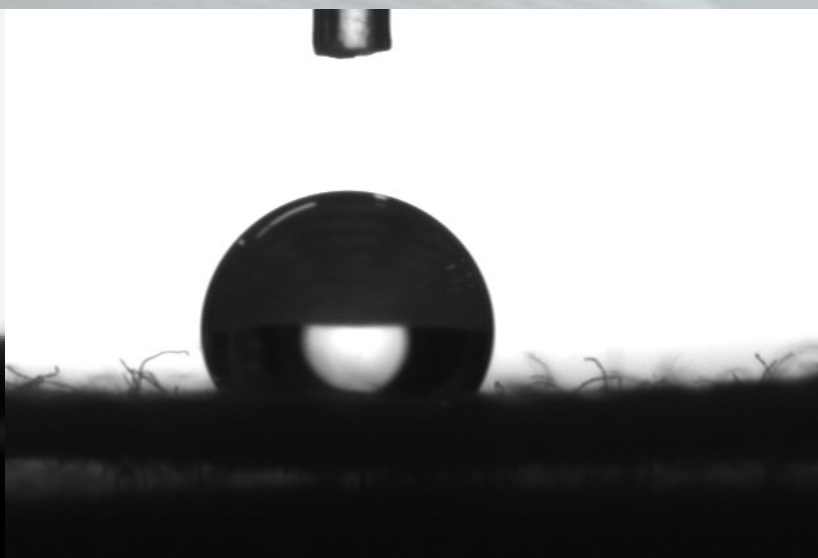


Effet Hydrofuge

Sans sol-gel



Avec sol-gel



Angles de contact eau sur coton

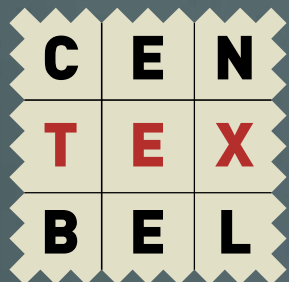
Effet Hydrofuge

Avec sol-gel

Avec sol-gel fluoré

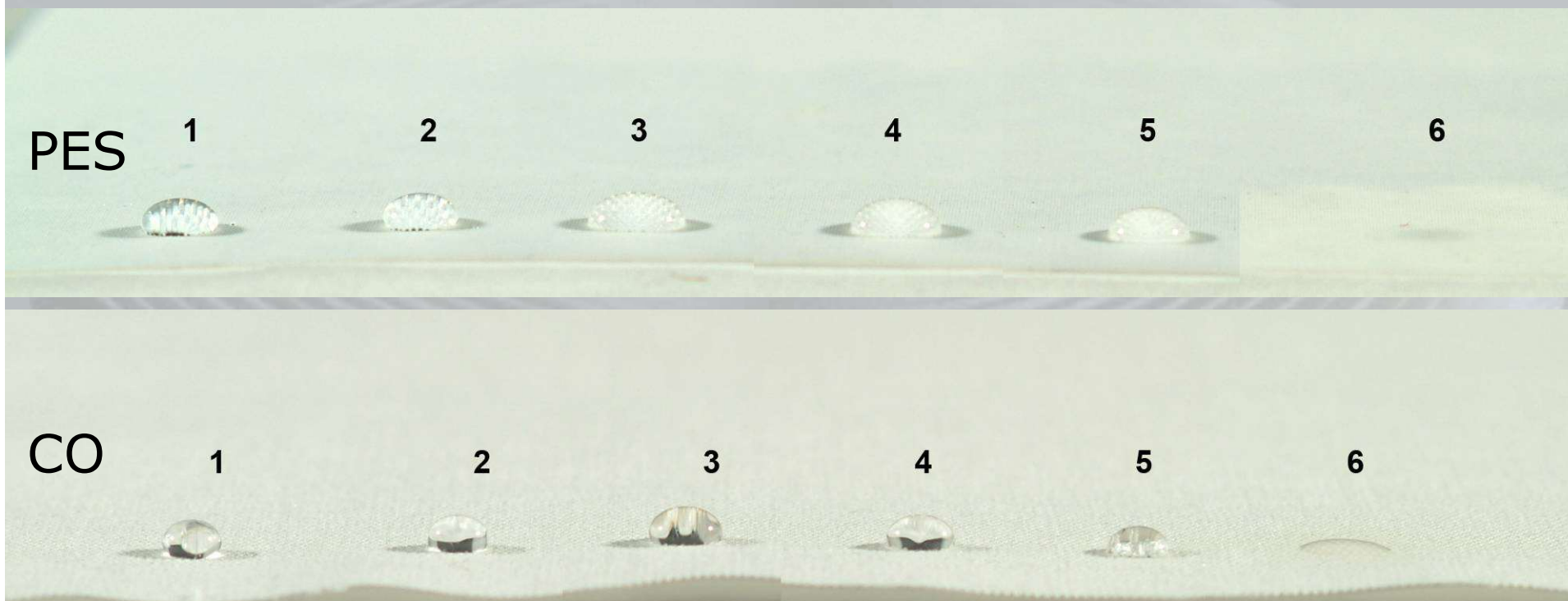


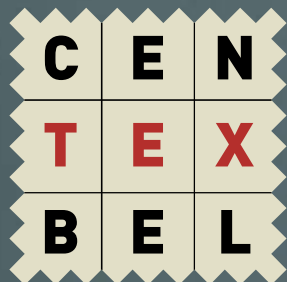
Angles de contact avec eau sur coton



Effet Oléofuge

Oil repellency selon ISO 14419-1998



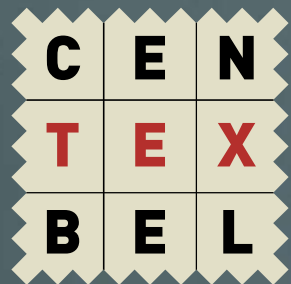


Effet Antimicrobien

Résultats sur polyester:

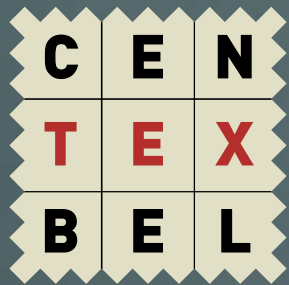
Traitement avec *Klebsiella pneumoniae* selon ASTM E 2149-01 (shake flask)

1% agent antimicrobien				0.5% agent antimicrobien			
<u>After 1 hour of contact time</u>		<u>After 24 hours of contact time</u>		<u>After 1 hour of contact time</u>		<u>After 24 hours of contact time</u>	
<u>Trial</u>	<u>Reduction %</u>	<u>Trial</u>	<u>Reduction %</u>	<u>Trial</u>	<u>Reduction %</u>	<u>Trial</u>	<u>Reduction %</u>
Flask 1	10,6	Flask 1	>99,99	Flask 1	-5,8	Flask 1	-1667,4
Flask 2	19,2	Flask 2	>99,99	Flask 2	-5,8	Flask 2	-1574,4
Mean	14,9	Mean	>99,99	Mean	-5,8	Mean	-1620,9



Substrats

- Coton
- Polyamide
- Polyester
- Polypropylène
- PVC



Perspectives

Hybritex:

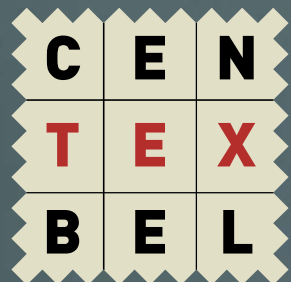
ECO EFFICIENT HYBRID COATINGS FOR
DURABLE TEXTILE APPLICATIONS

Application de sol-gel finish avec UV-curing

Et

Application de UV-curable sol-gel coatings

To be submitted to CORNET



Questions?

- Contact:

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Centexbel Gent

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+32 9 243 82 13