Functionalized sols for textile applications

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Technical Service
Finishing

CHT
BEZEMA

22nd IFATCC Congress
07.05.2010

IAC
TC

CHT Group at a Glance

About Us

FINISHING

UNIQUE IDEAS. UNIQUE SOLUTIONS.

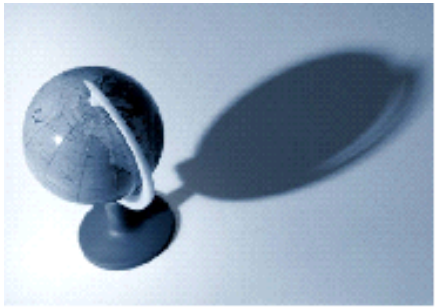
About Us

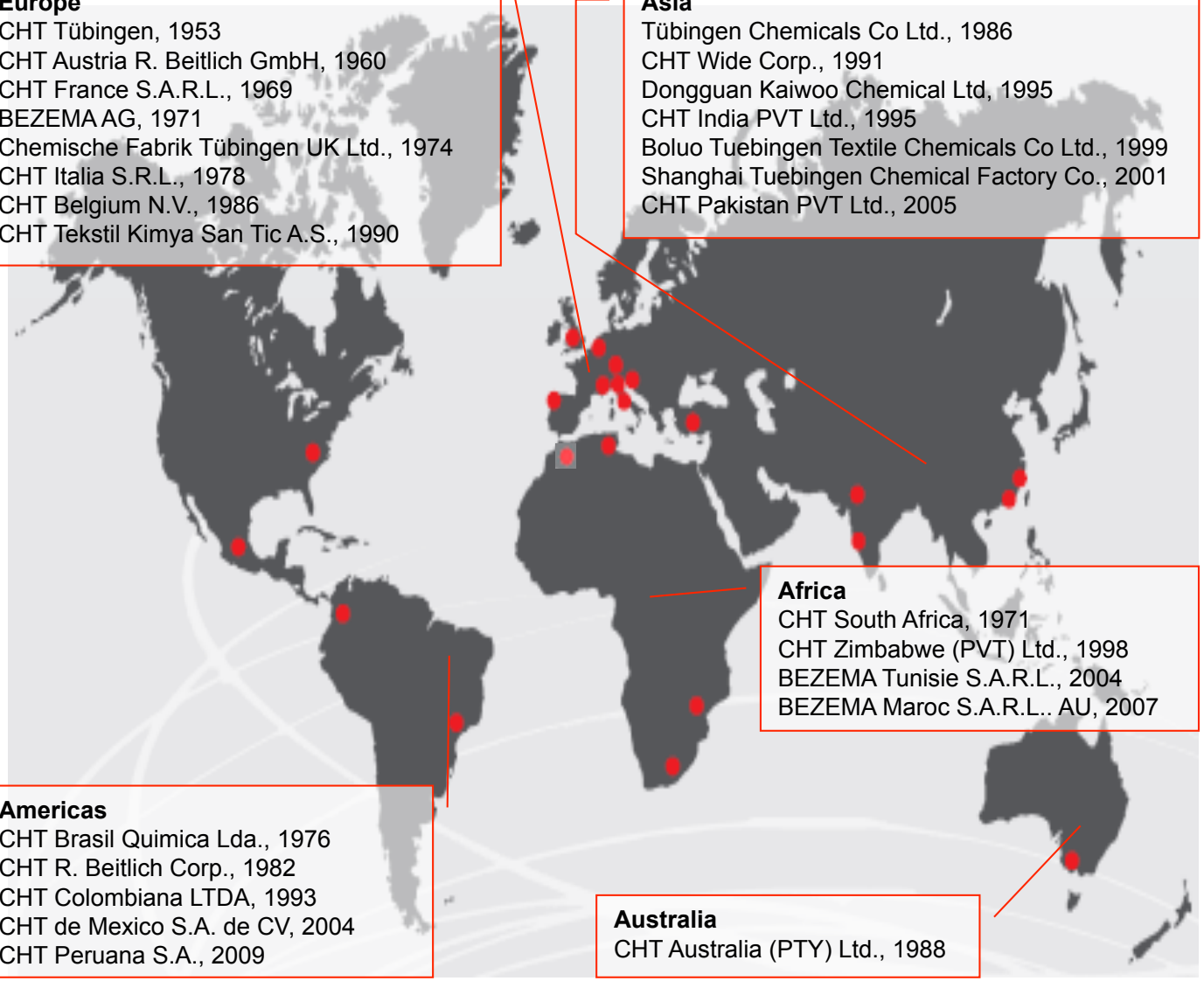
CHT group globally provides special chemicals and processing solutions for

- Textile Industry
- Laundry Industry
- Building Chemicals
- Performance Chemicals

Affiliates

About Us





Europe
CHT Tübingen, 1953
CHT Austria R. Beitlich GmbH, 1960
CHT France S.A.R.L., 1969
BEZEMA AG, 1971
Chemische Fabrik Tübingen UK Ltd., 1974
CHT Italia S.R.L., 1978
CHT Belgium N.V., 1986
CHT Tekstil Kimya San Tic A.S., 1990

Asia
Tübingen Chemicals Co Ltd., 1986
CHT Wide Corp., 1991
Dongguan Kaiwoo Chemical Ltd, 1995
CHT India PVT Ltd., 1995
Boluo Tuebingen Textile Chemicals Co Ltd., 1999
Shanghai Tuebingen Chemical Factory Co., 2001
CHT Pakistan PVT Ltd., 2005

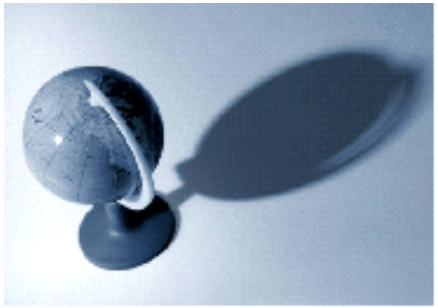
Africa
CHT South Africa, 1971
CHT Zimbabwe (PVT) Ltd., 1998
BEZEMA Tunisie S.A.R.L., 2004
BEZEMA Maroc S.A.R.L.. AU, 2007

Americas
CHT Brasil Quimica Lda., 1976
CHT R. Beitlich Corp., 1982
CHT Colombiana LTDA, 1993
CHT de Mexico S.A. de CV, 2004
CHT Peruana S.A., 2009

Australia
CHT Australia (PTY) Ltd., 1988

Key Figures of CHT Group

About Us



CHT BEZEMA - group — 22 affiliates all over the world 

Employees: app. 1.600 

Product range: app. 5.000 

Production 2009: app. 123.000 metric tons 

Sales 2009: 271 mio Euro 

Philosophy

About Us

- CHT is synonymous with constant innovation, customer-oriented product developments, high quality standard and an excellent customer service.
- Dynamic research and development enable CHT to create solutions of tomorrow.
- Many years of experience, high quality products and personal advisory service are our commitment to our customers, today and in the future.

Sol - gel process

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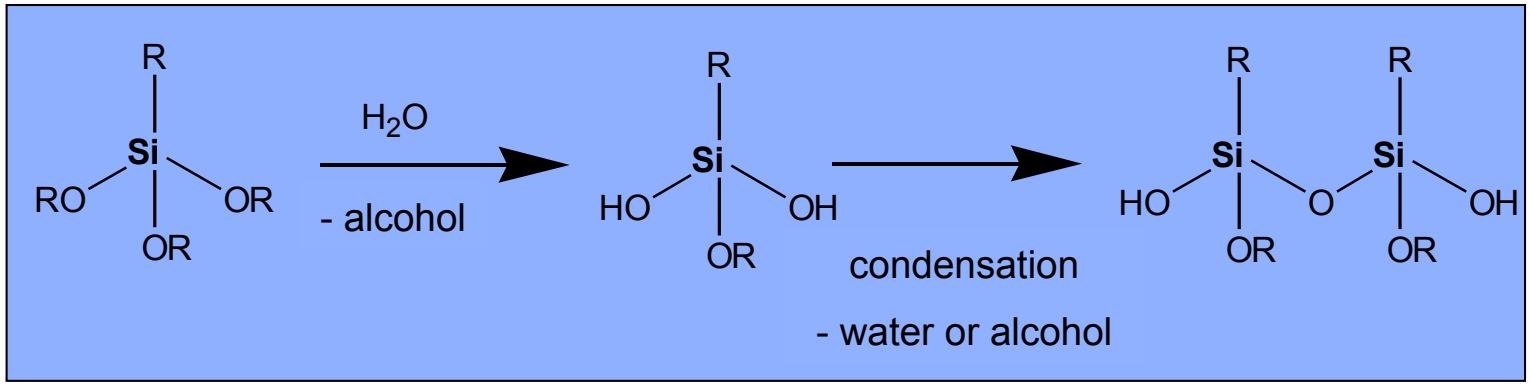
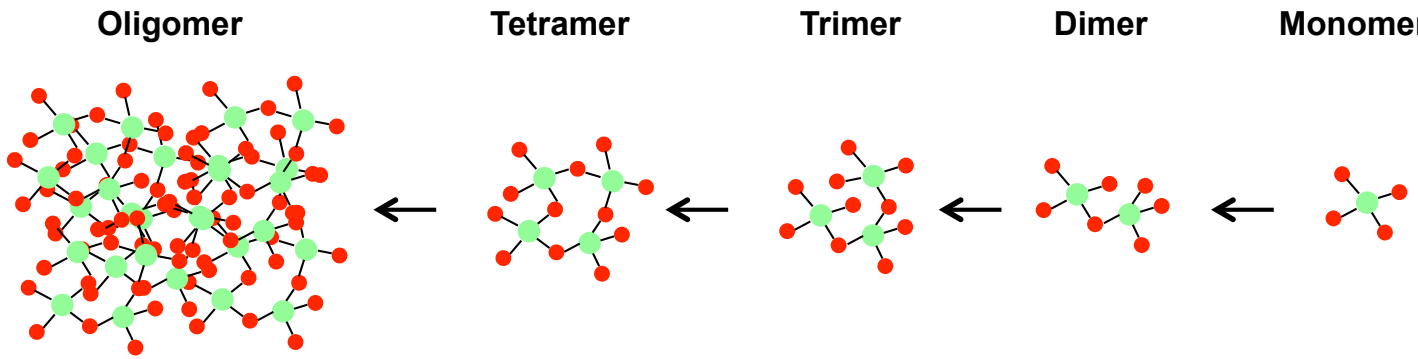
Chemical basics

Sol gel process

Synthesis of sols:
By hydrolysis and condensation of metal alcohols

M = Si, Ti, Zr, Al, ….
R = organic groups or alkoxy



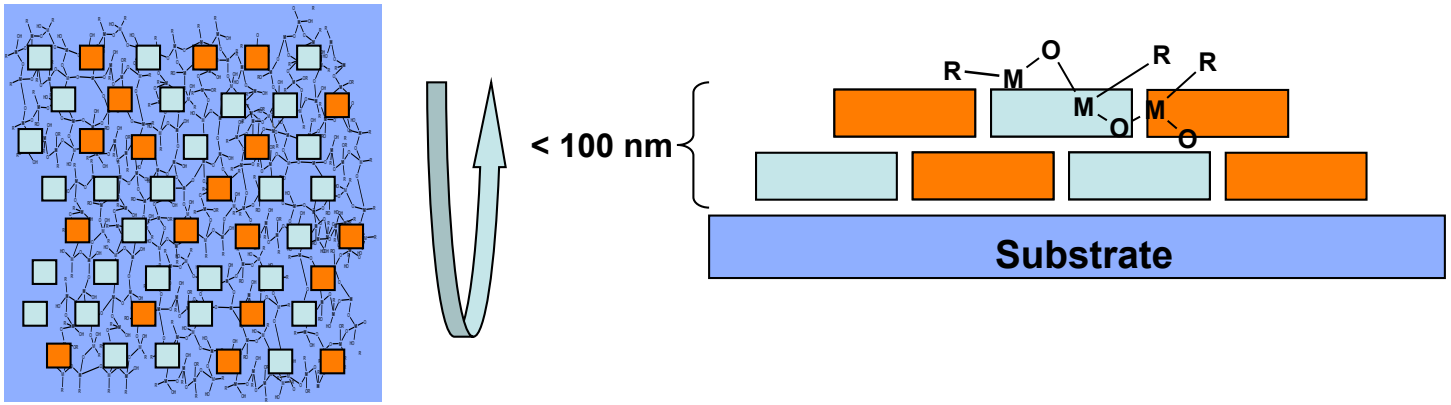


Layer building with sols

Sol gel process

- Functionality by selection of the organic groups and by variation of the metal atom
- Controlled effects by targeted adustment of the conditions of organic to inorganic parts

→ **many possibilities by the sol gel process**



R = Alkyl, epoxy, amino, carboxylic acid, perfluoro, methacrylate groups, etc.

M = Si, Al, Ti, Zr

Profile of demands of sols for textile applications

Sols for textile practice

	Sol gel process	Textile
Storage stability	Limited, cooling necessary	During months at room temperature
Solvents	Combustible	Aqueous
Application / Concentration	Dipping ~ 1000 g/l	Padding e. g. 50 g/l
Condensation temperature	~ 400° C	max. 1 min at 170° C

iSys MTX - chemistry

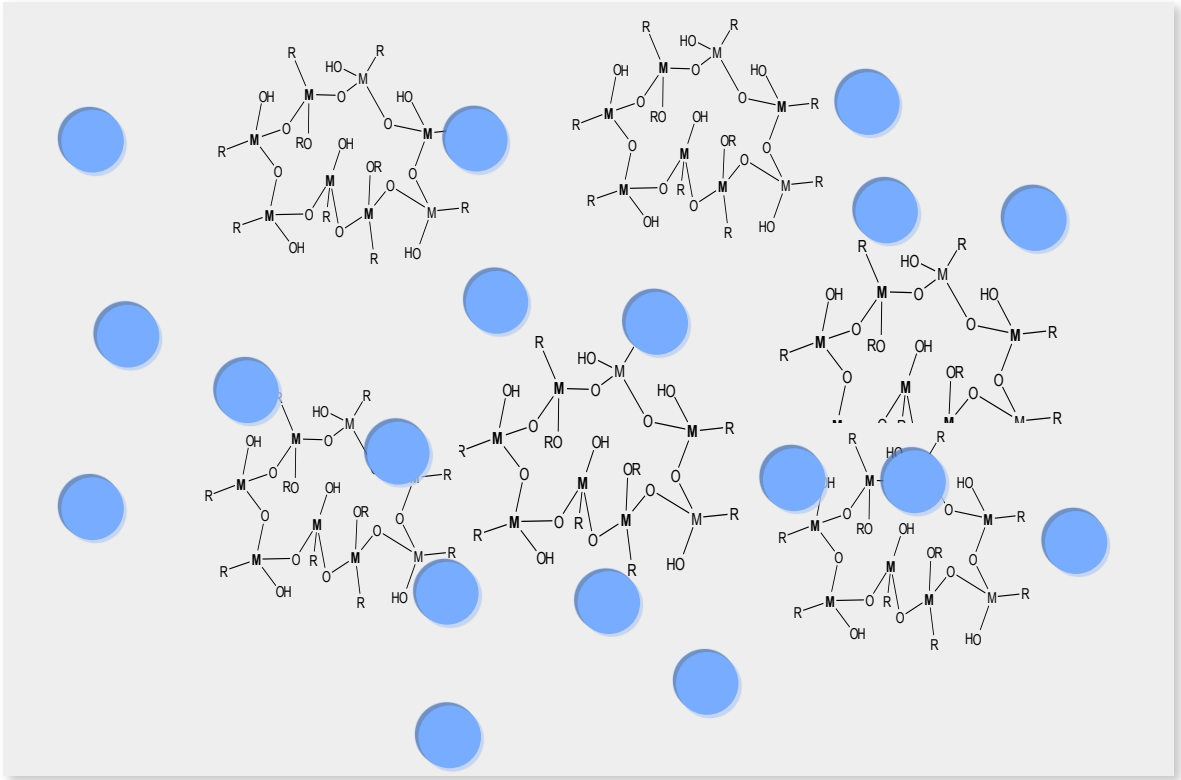
Sol gel process

Def.: A sol is a colloidal suspension of a solid in a liquid. Colloids are very small systems consisting of just some thousand atoms.

= Water

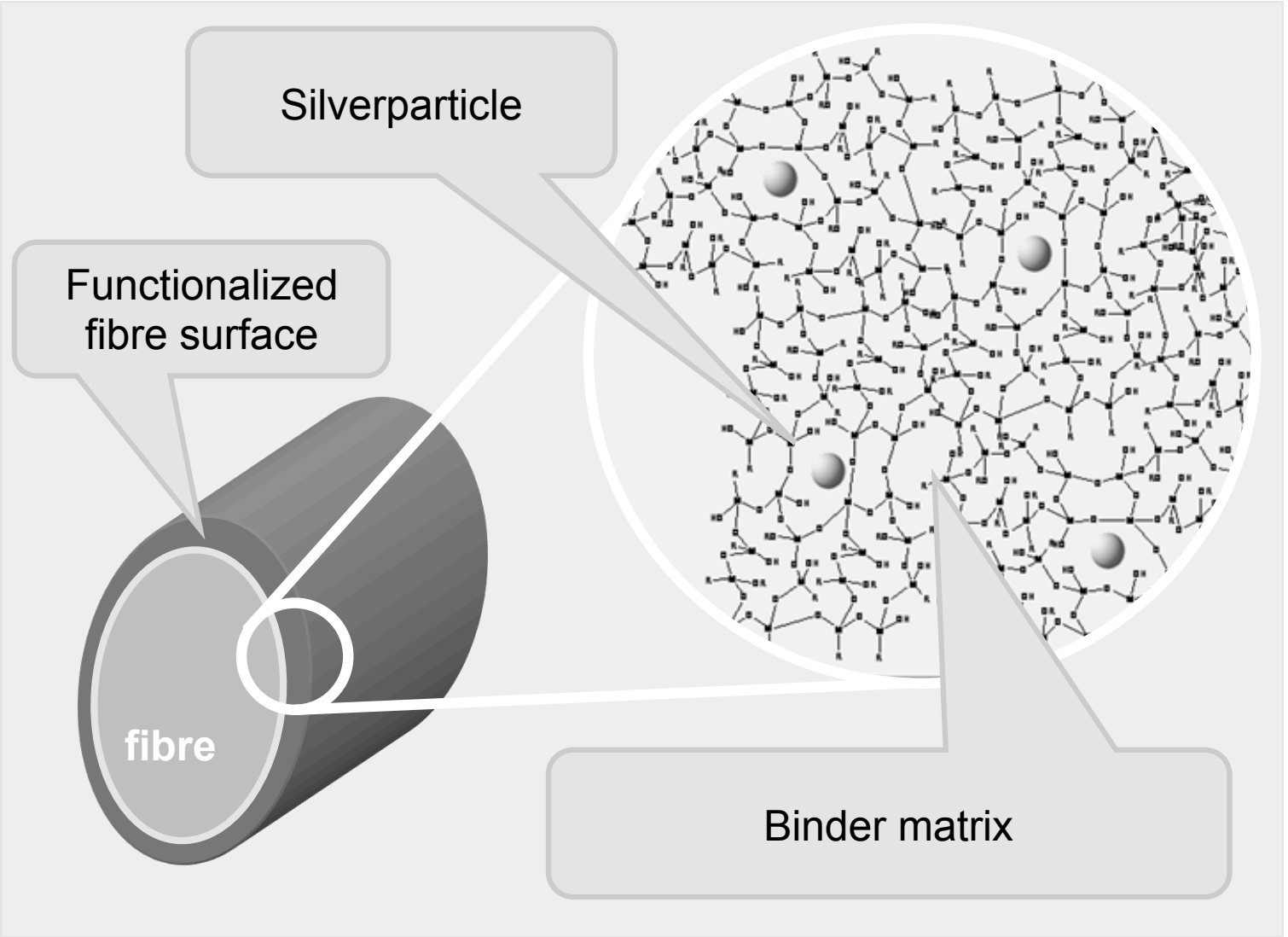
Application of iSys MTX with subsequent drying to form the gel on the textile:

liquor



Antibacterial finish

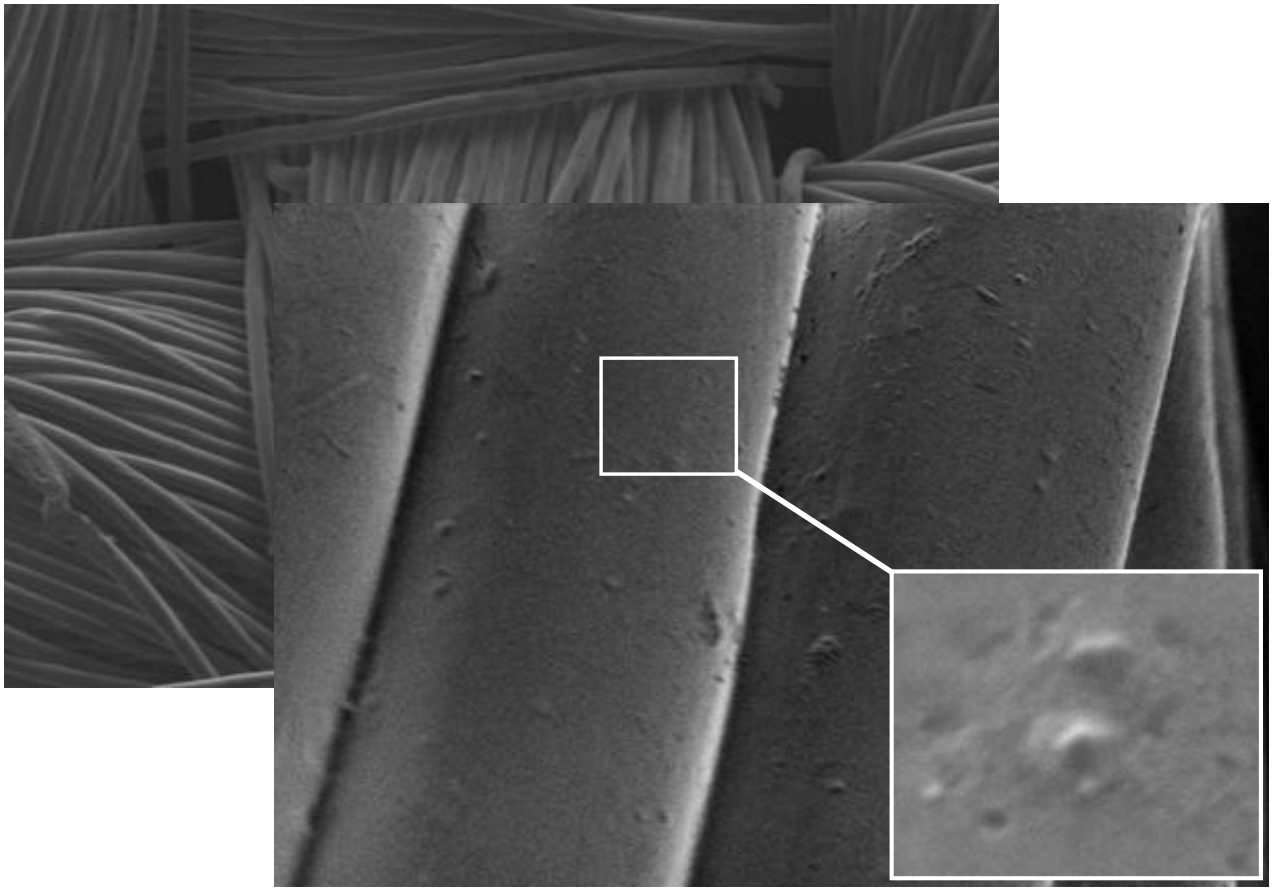
Antibacterial finish



iSys MTX & iSys AG
SEM-pictures

Antibacterial finish

On Polyester



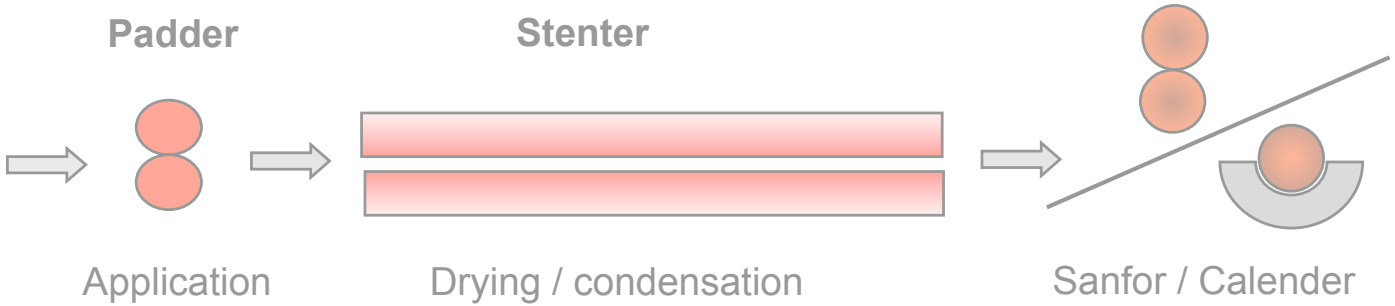
Innovation with system

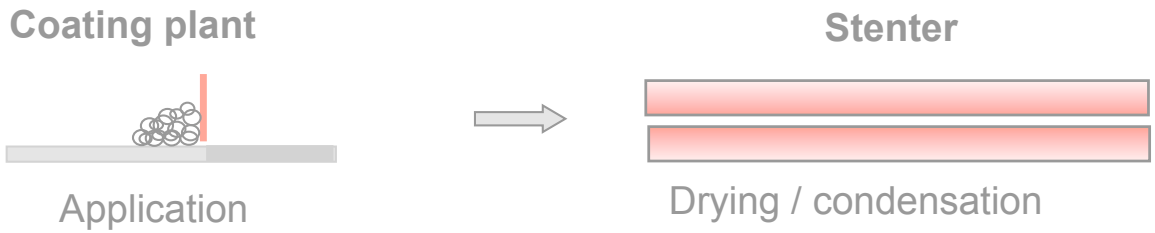
Antibacterial finish

- Strong antibacterial effect
- Easy application by padding with low application amounts
- High wash durability
- Flexibility with fabric choice
- Good liquor stability
- Can be combined with other effects

Application process

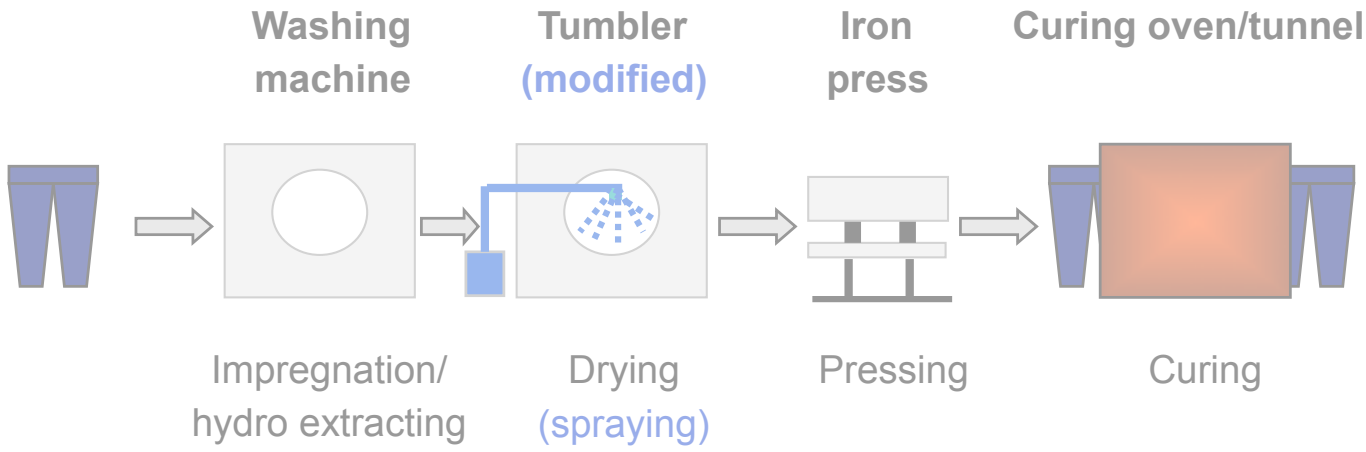
Antibacterial finish

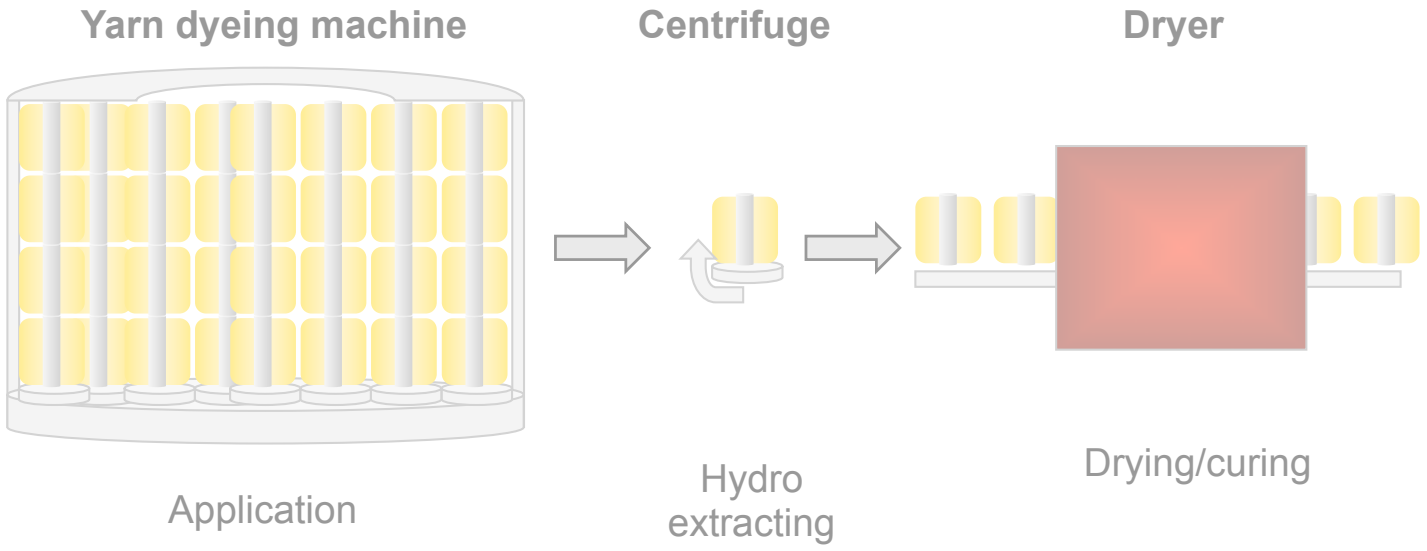




Application process

Antibacterial finish



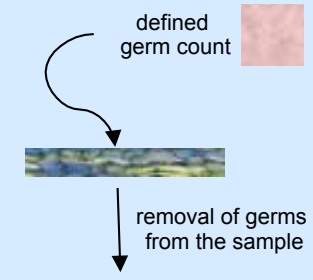


Verification of antibacterial activity – Research Institute Hohenstein

Antibacterial finish

- Tested according to:
  JIS L 1902 : 2002
- Evaluation:
  Basis is the comparison of untreated with treated sample. The “specific antibacterial effect” is determined by the difference of germ content between the control fabric and the sample.

Test principle:



- ✓ **Antibacterial effect of iSys AG + iSys MTX**
- ✓ **High durability of system iSys AG + iSys MTX**

Biological safety of iSys MTX and iSys AG

Antimicrobial finish

HOHENSTEIN INSTITUTES

The biological safety of finishes with iSys MTX and iSys AG has been tested acc. to different test methods at Hohenstein Institutes:

- Irritation potential to the skin
- Risk potential of DNA damage
- Inflammation potential of inhaled nanoparticles

Biological safety of iSys MTX and iSys AG was confirmed !

Hohenstein Quality Label for nanotechnology

Antibacterial finish

Definition:

"The nanoparticles or nanolayers in or on the textile must be systematically arranged and thus demonstrably result in a new or improved function."

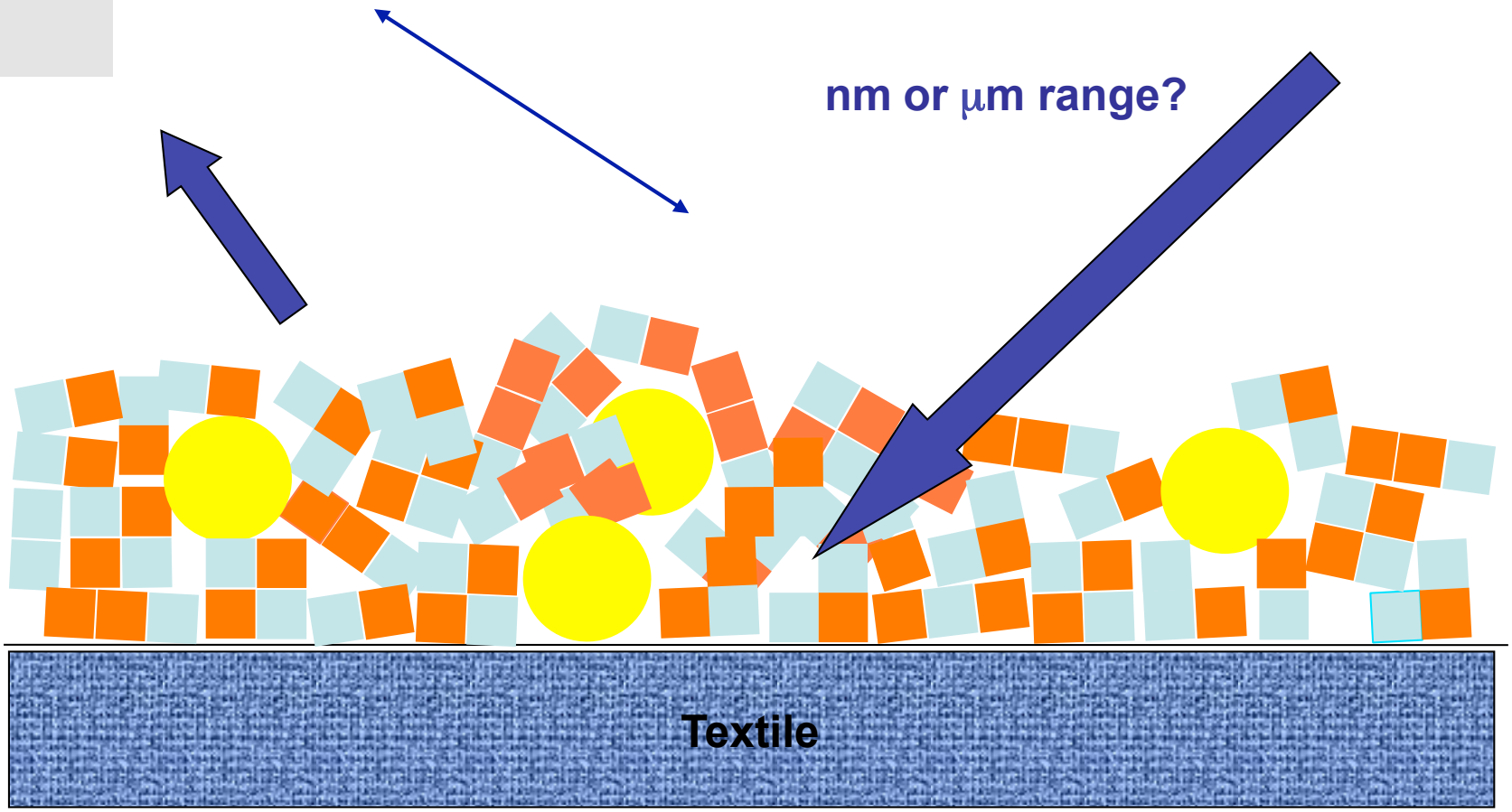
(www.hohenstein.de)

If requested, fabrics treated with iSys MTX and iSys AG as antimicrobial functionality can obtain the quality label for nanotechnology.

Abrasion problem?

Antibacterial finish

Size of loose particles from a coated textile?

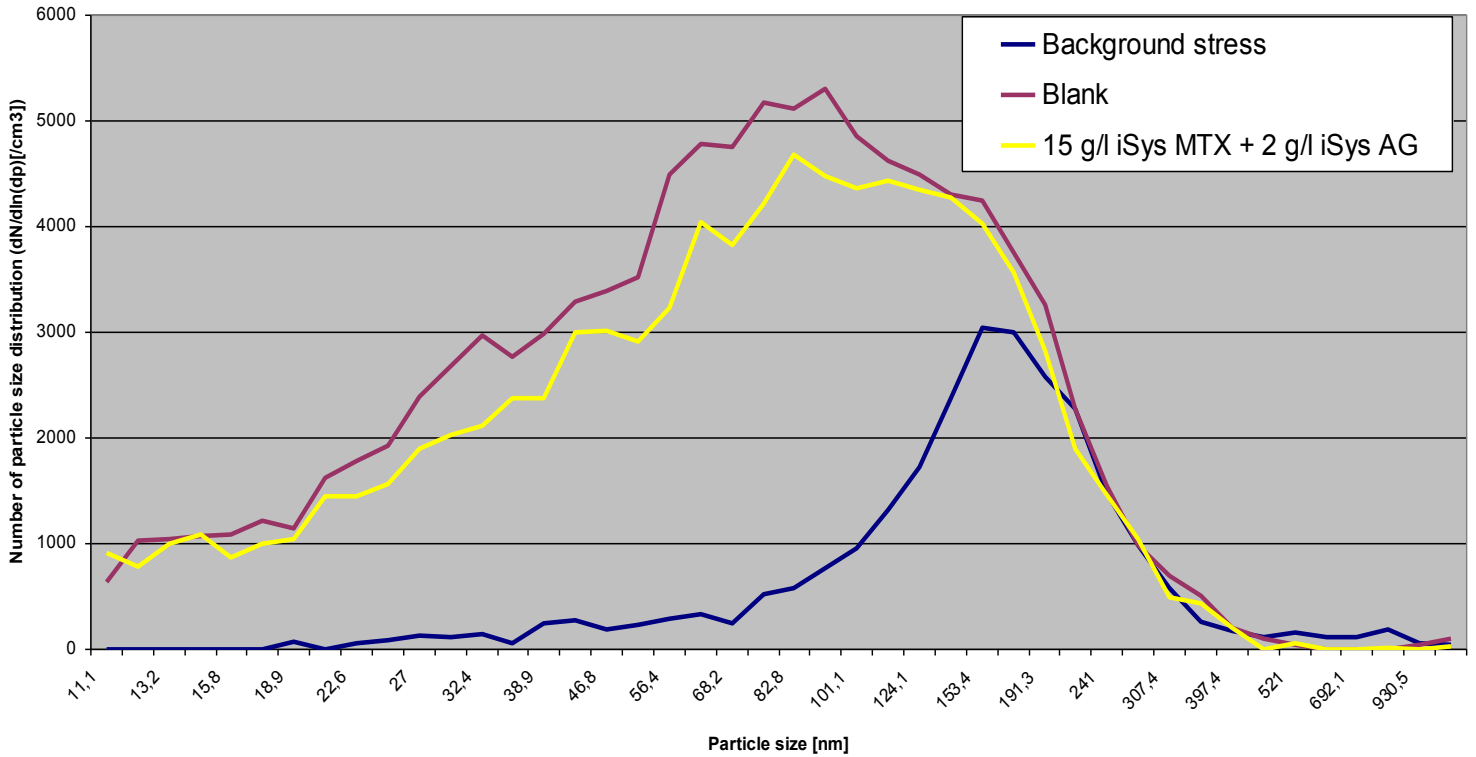


Release of particles of iSys MTX and iSys AG

Antibacterial finish

Method:

SMPS (Sequencial Mobility Particle Sizer) consisting of CPC (Condensations Particle Counter) and DMA (Dynamic Mobile Analyzer)



Smokers room: 500.000/cm³

No increase of the concentration of nano particles by finishing with iSys MTX and iSys AG => There is no hazard to be expected

iSys AG - Oeko-Tex Standard 100

Antimicrobial finish

- iSys AG was controlled by independent toxicologists and assessed as harmless substance for human health if it is used correctly according to its operating instructions and product safety standards.
- Fabrics finished with iSys AG can reach Oeko-Tex Standard 100 (product class I – textiles for babies and small children)
- iSys AG is on the Oeko-Tex list of auxiliaries for biological active finish (www.oeko-tex.com)

Vector Protection Finish

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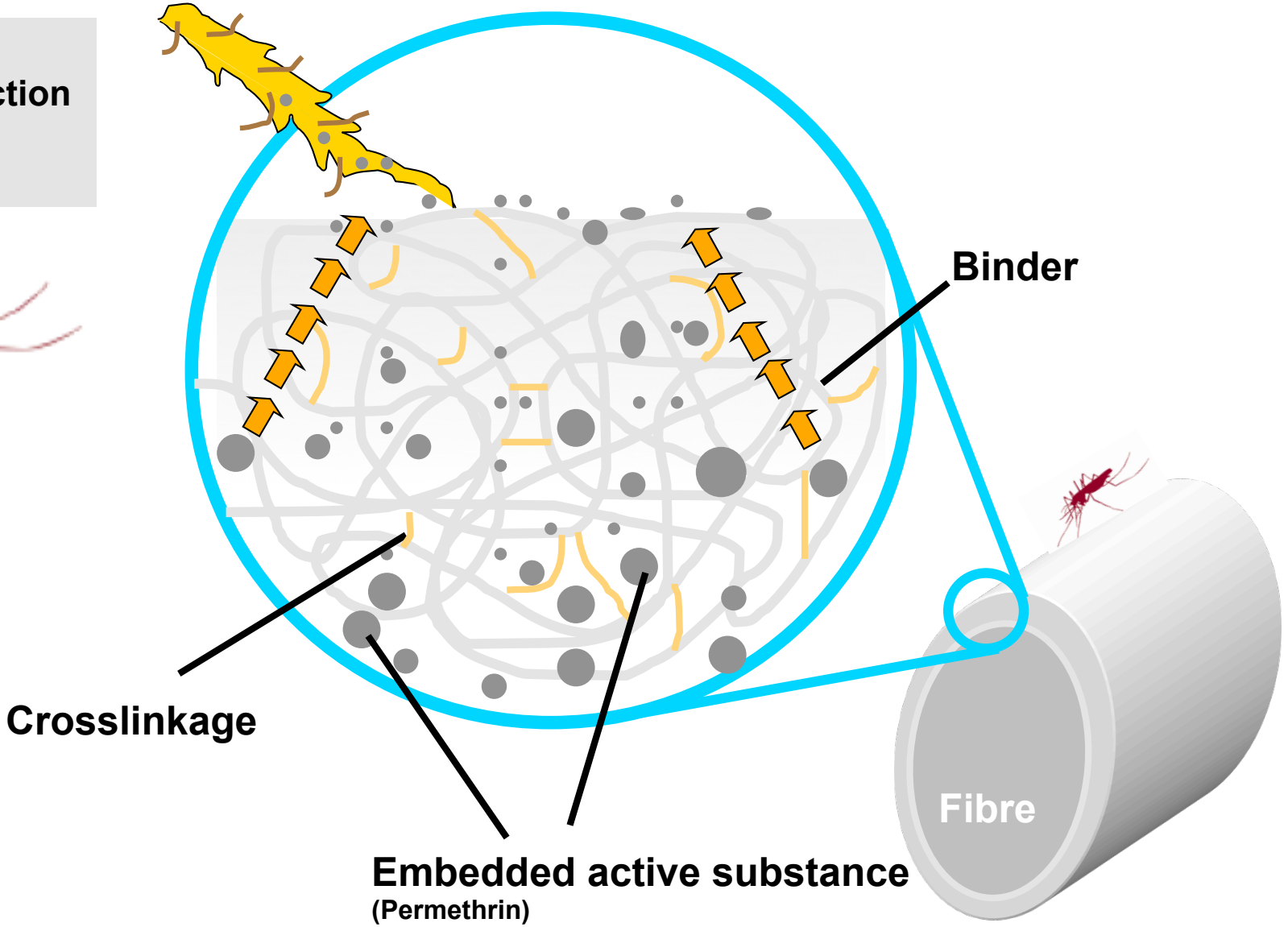
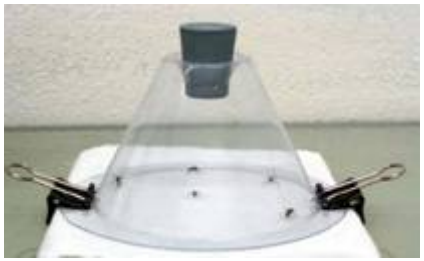
Controlled release of Permethrin to the fibre surface

Vector protection finish



Product system

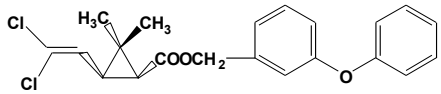
Vector protection finish



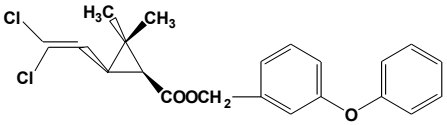
BEMATIN PER 40

Permethrine based product

m-Phenoxybenzyl-3-(2,2-dichlorvinyl)-2-dimethyl-cyclopropan-carboxylat



cis-Configuration

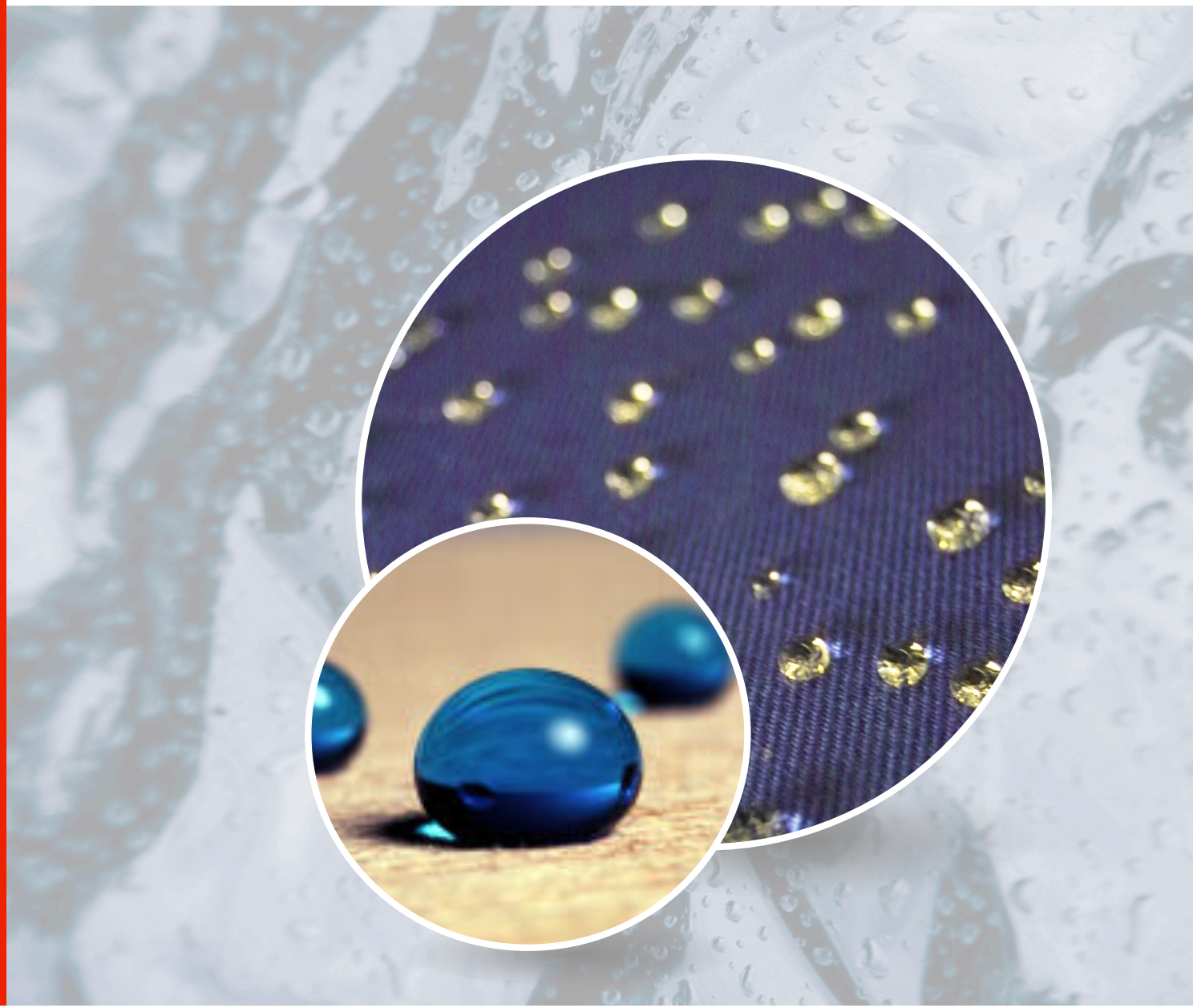


trans-Configuration

iSys SYN

Synergetic blend of inorganic-organic sol with polyurethane polymer, hydrophilic

Hydrophobic finish



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Hydrophobic finish without fluorcarbon

Hydrophobic finish

iSys HPX	Synergetic blend of inorganic-organic sol with polysiloxane

THANK YOU FOR YOUR ATTENTION !