

## All in One: Six functions in one textile coating

**Nowadays, textiles are more than just clothing, bags, sacks or ropes. Textile fabrics for technical sectors often consist of high-tech materials, are used as geo-textiles and generally present functional and protective clothing. Due to the textiles' diverse application fields, further functionalities such as flame protection, antistatics or hydrophobicity are challenged from the starting materials, besides the requirements to mechanic strength and physiological properties. As it is not possible to fulfill all demanded properties with fiber materials and textile structures, the textiles are accordingly refined. Until now, equipping textiles in one refinement process with one product combining several functionalities was not possible. Together with research and industrial partners, scientists of the Fraunhofer Institute for Silicate Research ISC developed a novel water-based refinement solution. The coating system »InnoSolTex« enables the combination of up to six functions in a single process step.**

Contract finishers often need to equip textiles with various product properties such as hydrophobicity/hydrophilation, ease of care, anti-statics, flame protection and antimicrobial properties. The challenge in formula composition is to match the often not harmonizing chemical properties of the textile auxiliary agents and to consider the different properties of fiber materials in the textile. Thus, more work steps might be necessary which leads to higher efforts, energy and disposal costs.

In the project funded by the Federal Ministry of Education and Research BMBF, Fraunhofer ISC and Sächsischen Textilforschungsinstitut e.V. (STFI), T\_O\_P Oberflächen GmbH as well as the industrial partners Schneider Textilveredlung GmbH, Alterfil Nähfaden GmbH and ROWO Coating Gesellschaft für Beschichtung mbH aim at combining the yet incompatible functions abrasion-resistant, flame-resistant, hydrophobic, antimicrobial, antistatic and washable in one refinement solution. Basis for the novel refinement solution »InnoSolTex« is the material class of Ormocer®s. Thanks to their diverse functionality, the property profiles are precisely and easy controllable in accordance with their requirements.

The water-based coating system »InnoSolTex« allows to equip textiles with hydrophobic, flame-resistant, washable, antistatic, abrasion-resistant and antimicrobial properties. Designed as modular system individually cut functional and property profiles can be configured. Thus, the textile industry is equipped with a refinement system according to the modular design principle which fulfills, with up to six functions in one coating solution, diverse requirements.

### The six combinable properties at a glance

- Abrasion-resistant
- Antimicrobial
- Antistatic
- Hydrophobic
- Washable
- Flame-resistant

### One working step in production and low costs

Fraunhofer ISC's newly developed coating can be applied on web fabrics, woven or non-woven as well as on threads. Another asset: The textiles equipment can be manufactured with already existing production

plants and in only one working step. Different properties can be combined according to demand. »InnoSolTEX« is as easily processible as conventional textile auxiliary agents and can be diluted with water. At 6 °C »InnoSolTEX« can be stored for a couple of weeks without causing product changes. Tests on the thread coating have shown that coated threads are the perfect match for processing fabrics. Furthermore, they don't break or stick and can easily be reeled off the quill even at higher machine speeds.

At the STFI e.V., samples of the new coating material have been functionalized and dried at 110°C and annealed at 170°C. Textiles refined with »InnoSolTEX« are washable at 60°C (maximum) easy care laundry. Appearances of stress whitening or pilling were not determined. Even after several wash cycles, the textiles remain stable and continue to show antimicrobial activities. Advantages of the novel hybrid refinement solution add up. Above all: less process steps in production, low energy and production costs and, an efficient product which can smoothly be processed with conventional industry plants. Cross-linking- and drying-time are similar to traditional textile auxiliary agents.

### Versatile application

Additional scopes of application for the novel textile coatings will soon follow and that way, there might be new possibilities in the field of air purification. Filter fleece materials for air conditioning in public facilities, hotels or vehicles can be functionalized thanks to the new coating. Also, flame-resistant properties of textiles might lead to further use in fire protection, e.g. curtains in large rooms or public facilities. Textile coatings in vehicles interior are also feasible – to cite but a few examples.



Hydrophobic effect of refinement. © Knud Dobberke for Fraunhofer ISC

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