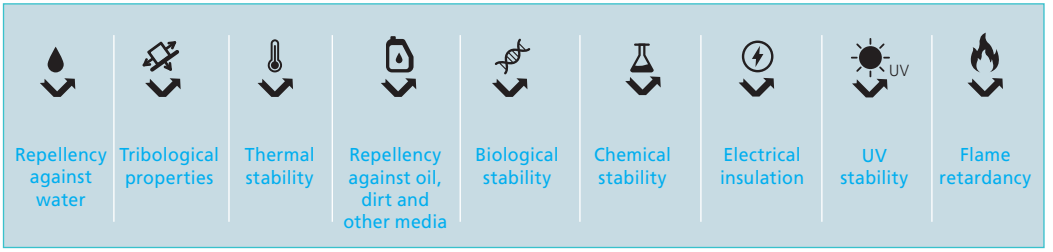
Fraunhofer ISC

Fraunhofer Institute for Silicate Research ISC

ORMOCER® for PFAS-free surfaces

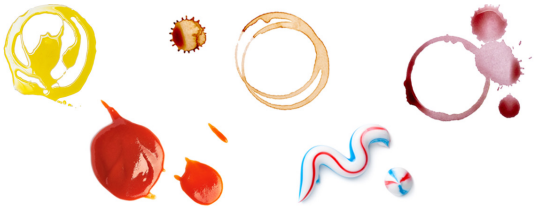
Fluorine-free functional coatings: Promising and sustainable alternatives to PFAS

ORMOCER® materials are organic-inorganic hybrid polymers that combine the advantages of both material worlds. By using a molecular design toolbox, the properties can be customized and adapted to a desired specification and application. In this way, many properties known from PFAS materials can be achieved and substitution facilitated.



Applications range from packaging, textiles, and automotive to medical devices and aerospace. A precise understanding of the requirement profile helps identify suitable replacements and evaluate the appropriate ORMOCER®.

Fluorine-free functional coatings



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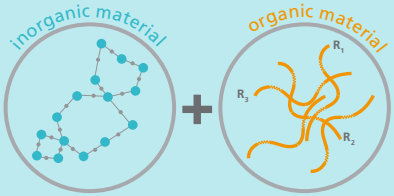
Many applications require media repellency. PFAS offer not only hydrophobicity, but also omniphobicity in general, meaning that all substances will be repelled including water, oil, toothpaste, coffee and red wine. ORMOCER® can do all of this with surface energies of less than 20 mN/m.

ORMOCER® coatings are also thermally resistant up to 280 °C at continuous load, chemically resistant to acids, cleaning agents, solvents or oils (even at high temperatures for a long period of time) and have an electrically insulating effect.

Please contact us to explore the potential of ORMOCER® coatings as PFAS alternatives in your products.



ORMOCER® coatings combine

- advantages of inorganic with organic materials
- several functionalities in one layer

Properties

- Processability at moderate conditions
- Very good adhesion to almost all types of substrates
- Scalability and suitable for standard processes

Applications

- Easy-to-clean and repellency for metal, glass and plastics
- Chemical & grease stability for paper and textiles

Fluorine-free coatings for textiles and food packaging

The goal of the "ZeroF" project is to replace PFAS with renewable raw materials and non-toxic compounds. The materials developed will be highly resistant to water, oil and grease while reducing environmental impact by at least 25 %. Fraunhofer ISC is focusing on the development of an omniphobic coating for textiles. The ORMOCER® system developed at the ISC serves as a PFAS alternative, optimized through tailored chemical composition, specific additives, and nano- and microstructuring.

ZEROF

The EU project "PLASMA-NICE" aimed to replace fluoropolymer-based grease barrier materials with sol-gel-coated bioplastics and to substitute non-renewable barrier packaging films with renewable energy-based materials. Preliminary biodegradability tests showed that the hybrid coating material achieved 90% degradation, highlighting its potential as a PFAS-free protective coating for biodegradable biopolymers (e.g., paper) in packaging applications.

For more information and further projects please scan the QR Code.

Contact

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