



ISERA
INNOVATION AND SERVICE IN ANALYTICS

INNOVATION and SERVICE in ANALYTICS



Inertised Glass Surfaces

New qualities of a proven material

The **ISERA Inertised Surface** process eliminates unwanted effects on glass surfaces and turns a proven basic material into a high-performance product.

Our versatile modification process provides the optimal surface characteristics required for your particular application.

Glass

A versatile material

Glass is one of the most important materials in the fields of analytics, diagnostics and pharmaceuticals. Due to its unique characteristics regarding thermal and chemical resistance, gas impermeability and formability glass is the material of choice for many technical applications, e.g. the primary packaging and transfer of fluids and gases.

In this respect the glass quality is of crucial importance. Nowadays class 1 borosilicate glass with a SiO_2 content of 70-80% and a B_2O_3 content of maximal 13% is predominantly used for bottling in the pharmaceutical industry or for sample vials in analytics. However, despite its high purity and durability the interaction of the glass surface with a medium can result in a detrimental change of the medium's composition.

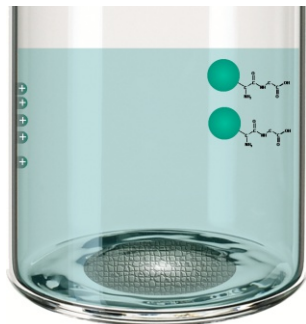


New challenges

Because of the constantly increasing demands concerning materials and surfaces even class 1 borosilicate glass often does not satisfy the quality requirements of analysts and users. E.g. alkali ions may diffuse from the glass, components of the sample

might absorb to the surface or deposits might be formed because of salts being present in the sample.

All these effects might lead to disadvantageous alterations of the materials coming in contact with the surface.



For example, scientific studies have demonstrated the sorption of pesticides on a glass surface as well as a loss of activity of bactericidal peptides and proteins after adsorption on glass.^{1,2}

To avoid such undefined effects the siliconisation of glass for special applications is often applied. In this procedure the glass surface is wetted with an aqueous emulsion of silicone oil and subsequently fixed by thermal treatment. The generated layer of silicone oil is often faulty. Moreover, remnants of unbound silicone oil might dissolve and lead to unwanted effects, e.g. the change of a protein structure.^{3,4}

The Inertised Surface Process

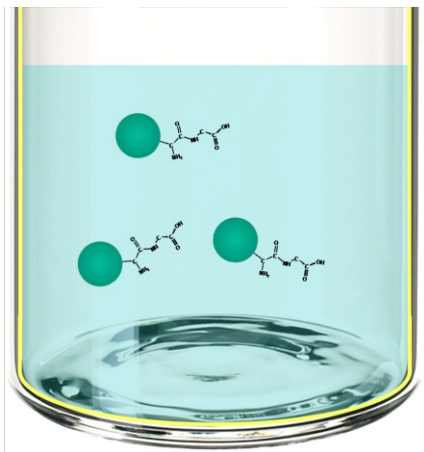
ISERA's Inertised Surface (IS) process enables the generation of inert surfaces that are resistant against different external exposures in high-quality.

In contrast to well-known siliconisation procedures no silicone oil is applied but a covalently bound molecular layer with appropriate functional groups creating the favoured surface characteristics is induced by a highly efficient gas-phase reaction.



- 1) Wessel-Bothe, S.; Pätzold, S.; Klein, C.; Behre, G.; Welp, G. J. Plant Nutr. Soil Sci. (2000), 163, 53-56.
- 2) Joosten, H. M. L. J.; Nuñez, M. Lett. Appl. Microbiol. (1995), 21, 389-392.
- 3) Eu, B.; Cairns, A.; Ding, G.; Cao, X.; Wen, Z.-Q. J. Pharm. Sci. (2011), 100, 1663-1670.
- 4) Jones, L. S.; Kaufmann, A.; Middaugh, C. R. J. Pharm. Sci. (2005), 94, 918-927.

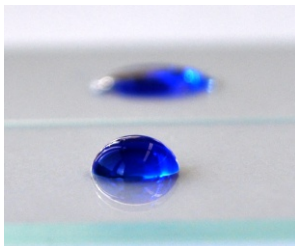
This results in a surface coating with sophisticated chemical, hydrolytical and thermal resistance as well as an excellent surface coverage.



Furthermore, the process enables the formation of surfaces with various characteristics regarding polarity and functionalisation. Undesired properties can be suppressed specifically.

A hydrophobic **IS**-surface for example minimises an electrostatic binding of proteins, the hydrolytic decomposition of sensitive compounds and the deposition of polar ingredients on the surface of sample vials and packaging containers.

Consequently, the influence by undesirable effects of untreated glass surfaces on the correctness of analytical measurements or on the medical effect of drugs is eliminated and the content of the container is protected against unwanted influences at its best.



Functional diversity

ISERA's modification process for glass surfaces provides a variety of options. Not only the classical hydrophobic surface induced by the correspondent molecular layer can be created. But also other surface characteristics can be provided depending on the field of application.

The following surface types are available already now or are in preparation:

- **IS-1** – hydrophobic surface for minimisation of electrostatic and polar adsorption.
- **IS-2** – hydrophobic surface with weak alkaline characteristics. Especially suited for basic compounds like amines.
- **IS-3** – fluorinated surface with extreme inertness (in preparation).
- **IS-4** – polar surface with high protein resistance (in preparation).



A dyed drop of water on different glass surfaces

Functional Diversity

The **ISERA Inertised Surface** process is applicable on any kind of glass surface. Sample vials of different sizes and designs are kept in stock for our customers. But of course we would be pleased to provide our support for your individual objective concerning the modification of glass surfaces or components.

Selection of sample vials *IS-1*

P/N	Description	
FKKG-093A01	1.5 ml Short Thread Vial <i>IS-1</i> , clear glass, 32 x 11.6 mm, wide opening	
FBRR-11Z001	1.5 ml Crimp Neck Vial <i>IS-1</i> , amber glass, 32 x 11.6 mm, label and filling lines	
FKME-06DB01	0.1 ml Micro Insert <i>IS-1</i> , clear glass, 31 x 6 mm, 15 mm top	
FBRR-08Y001	0.4 ml Crimp Neck Micro-Vial <i>IS-1</i> , amber glass, 30 x 7 mm, 10 mm top	

www.ISERA.de

Imprint:
ISERA GmbH
Kreuzauer Str. 46
52355 Düren, Germany

info@isera.de
Tel +49-(0)2421-972854-1
HRB 7178, AG Düren