

Dynasytan® 9165

Phenyltrimethoxysilane

Technical data

Properties and test methods	Value	Unit	Method
Flash Point	approx. 29	°C	DIN 51755
Boiling Point (1013 hPa)	approx. 211	°C	DIN 51751
Density (20 °C)	approx. 1.06	g/cm ³	DIN 51757

Registrations

Dynasytan® 9165

AICS (Australia):	Yes
DSL/NDSL (Canada):	Yes
PICCS (Philippines):	Yes
TSCA (USA):	Yes
IECS (P.R. China):	Yes
ENCS (Japan):	Yes
ECL (South Korea):	Yes
EINECS/ELINCS (EU):	Yes
REACH (Europe)	Registered

Dynasytan® 9165, a phenylfunctional silane modifies the surface of inorganic materials, and is an important component in sol-gel systems.

Dynasytan® 9165 is a colourless, low-viscosity liquid. Dynasytan® 9165 is regarded as trifunctional since all three alkoxy groups can hydrolyze. Dynasytan® 9165 also contains a phenyl group that exhibits excellent thermal stability and brings flexibility to sol-gel coating systems.

Safety and handling

Before considering the use of Dynasytan® products please read its Safety Data sheet (SDS) thoroughly for safety and toxicological data as well as for information on proper transportation, storage and use. The Safety Data Sheet is available after registration on our website www.dynasytan.com or upon request from your local representative, customer service or from Evonik Resource Efficiency GmbH, Product Safety Department, E-MAIL sds-hu@evonik.com.

Packaging, storage and shelf life

Dynasytan® 9165 is available in 25 kg and 200 kg drums.

When kept away from moisture, the shelf life of Dynasytan® 9165 in the original closed container is min. 6 months from delivery.

Properties and applications

Hydrolysis of Dynasylan® 9165 leads to silanol groups that, in a subsequent condensation reaction, form very stable siloxane (-Si-O-Si-) bonds. Condensation occurs parallel to hydrolysis once a certain amount of silanol groups have formed. The silanol groups can also react with -OH groups on inorganic surfaces. The absolute and relative rates of hydrolysis and condensation depend on a number of factors: e.g. pH, concentration, solvent, temperature and identity of the catalyst. Hydrolysis in dilute aqueous solutions, under addition of a hydrolysis catalyst rapidly yields two layers. Partial hydrolysis is also possible and results in storage stable formulations. Dynasylan® 9165 reacts faster with water than Dynasylan® 9265.

Partial Hydrolysis

Dynasylan® 9165 can be hydrolyzed by addition of 1.3 mol water per mol Si with maleic acid catalyst. After about 30 minutes a clear solution forms. This solution is stable for several weeks before two layers form. The formation of two layers can be avoided by addition of methoxypropanol.

Inorganic Surface Modification

Dynasylan® 9165 is used to modify the surface of inorganic fillers such as wollastonite and aluminum trihydroxide (ATH).

Dynasylan® 9165 makes the surface of these inorganic fillers more hydrophobic and thus increases their dispersability in mineral-filled polymers. Dynasylan® 9165 is especially suited for polymers that are processed at elevated temperatures. Dynasylan® 9165 reduces the viscosity of the polymer melt.

Sol-Gel Applications

In many sol-gel applications Dynasylan® 9165 is partially hydrolyzed to form a preproduct that can be further crosslinked using temperature. This pre-hydrolysis is often made in conjunction with alkyl silanes (Dynasylan® MTES) or other organofunctional silanes (e.g. Dynasylan® GLYMO), silicic acid esters, or even an aqueous silica sol. This pre-product can be further modified by addition of organic resins or inorganic nanoparticles such as AEROSIL®.

It is also possible to construct an inorganic/organic network by adding silanes containing organofunctional groups (e.g. aminopropyl groups) and organic resins. The mixture is then cured using standard methods. In this way it is possible to obtain more resistant coatings having a higher UV-stability than traditional organic coatings. This can also lead to more heat resistant materials than using traditional resins.

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