DuPont™ Tyzor® Organic Titanates
Product Information - Tyzor® LA

Description

DuPont™ TYZOR® LA is a hydrolytically stable lactic acid titanium chelate, ammonium salt, titanate (2-), dihydoxy bis [2-hydroypropanato (2-)-O^1, O^2]-, ammonium salt, CAS# 65104-06-5. TYZOR® LA is 50 % active content in aqueous solution. TYZOR® LA is a clear to slightly hazy colorless to yellowish aqueous liquid. Main use of TYZOR® LA is for cross-linking in aqueous systems, catalysis and adhesion promotion. TYZOR® LA is miscible with water.

Typical Properties of TYZOR® LA *

Property	Value	Unit
Molecular weight	294 (solvent free product)	g/mol
TiO_2 content	ca. 13.8	%
Ti content	ca. 8.2	%
Density (25 °C)	ca.1.21	g/cm^3
Viscosity (25 °C)	ca. 9	mPa*s
pH	ca. 8-9	
Melting point	ca. -10	°C
Boiling Point (1013 hPa)	ca. 100 (water)	°C
Flash point	not flammable	

*This table gives typical properties. DuPont does not make any express or implied warranty that these products will continue to have these typical properties.

Reactions

TYZOR® LA is a water based titanium chelate that is stable in water at pH = 7 even in the presence of possible reactants. TYZOR® LA is thus an excellent choice for use aqueous systems. The lactic acid chelate ammonium salt provides solubility and enough chelating power to prevent water hydrolysis or reaction under these conditions. TYZOR® LA is stable so long as the pH is maintained around 7-7.8. Reactions with TYZOR® LA occur when the pH is lower than 6 or higher than 8 or at temperatures > 100°C. TYZOR® LA can also function as a catalyst for carboxylic acid direct esterification particularly when water concentrations in the raw materials are too high to use other slightly more efficient products like TYZOR® TPT, TnBT or TPT-20B. Fatty acid ester exchange or transesterification is another reaction that is catalyzed by TYZOR® LA. TYZOR® LA can be used as an adhesion promoter or as a crosslinking agent in coatings where the pH increases with drying or where there are functional groups such as OH or COOH are available for such reactions, especially at higher temperatures.

Applications

TYZOR® LA can be used as additive, as coating/primer, in sol-gel systems as base material or in other applications are:

Esterification / Transesterification:
(Plasticizer, glycerides, different esters)
elimination of by products, high yield, easy work up, *low catalyst concentrations*

Water borne Paints/ Polymers:
crosslinking of paint binders, polymers, adhesion promotion, gel formation

Coatings:
(glass, metal, filler, pigment treatment)
surface hardness, adhesion promotion, improved dispersion, coloring effects, corrosion protection

Functions

Catalyst: As esterification catalyst TYZOR® LA is used in an amount of ca 0.01-1 %. The titanate is often added as the last ingredient of the reaction components to prevent undesired pre-reactions. Transesterifications run at low temperatures > 100 °C. Esterifications (e.g. plasticizer preparation) need temperatures of > 180 °C. TYZOR® LA is an excellent polycondensation catalyst.

Crosslinking: For cross-linking reactions TYZOR® LA is added to the polymer / binder in concentrations of ca. 0.5 - 5 %. pH or temperature regulation will allow control of the reaction progress.

Primer: As primer TYZOR® LA is applied normally in very low concentrations of ca. 0.1-5 % in water with a polar organic solvent such as isopropanol to aid wetting surfaces. Heating after application to ca. 80-100 °C for a short time will set up the titanate surface for other coatings.

Coating: Titanium dioxide layers form when a surface is coated with dilute solutions containing TYZOR® LA followed by a thermal or hydrolytic processes. Thermal decomposition occurs at > 350 - 600 °C.. The application process involves spraying, dipping or brushing of the substrate from dilute solutions.

Contact Information:

Web Site http://www.dupont.com/tyzor
Email: tyzor@usa.dupont.com
Phone: 800-255-4596 or 302-992-2894

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