PRODUCT CATALOG

FEBRUARY 2026

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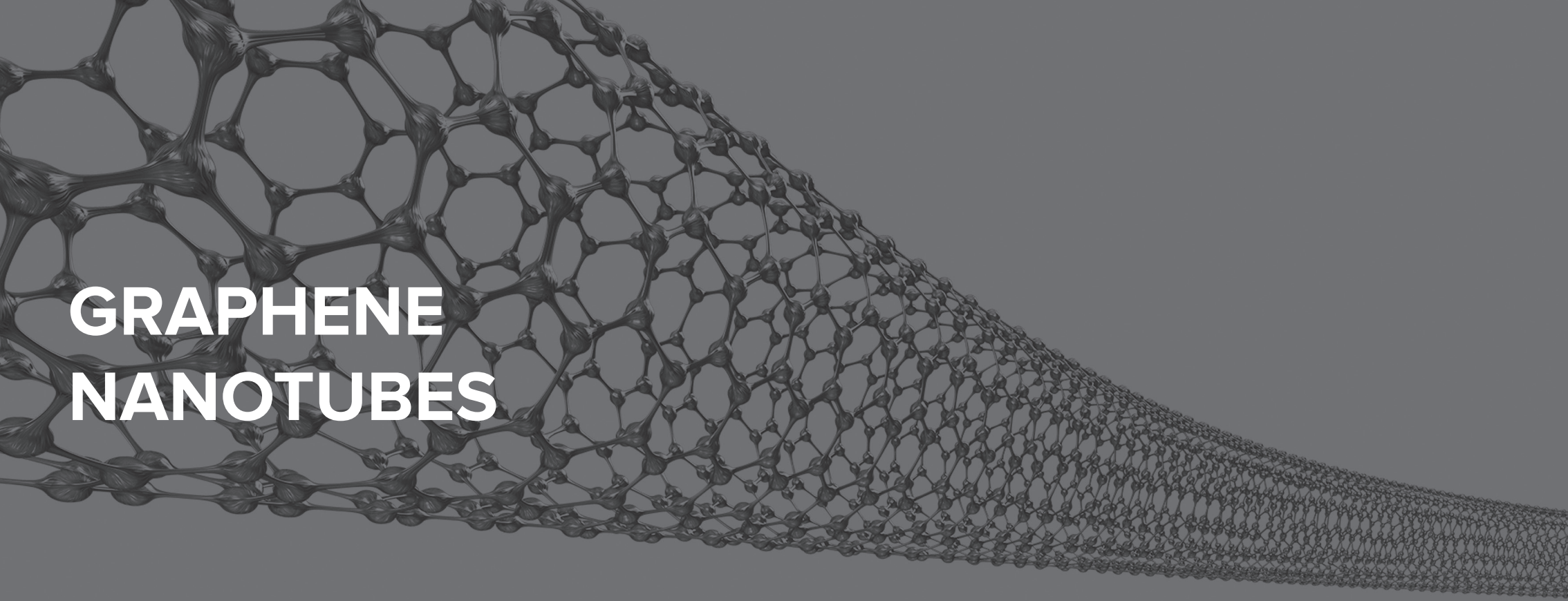


GRAPHENE NANOTUBES

TUBALL™

Diameter

1.6±0.4 nm

Length

>5 µm

GRAPHENE NANOTUBES

Human existence is shaped by the materials we use. More than 50% of all basic materials can be improved by introducing a universal material: single wall carbon nanotubes. These tiny tubes provide us with a rare opportunity to create nanoaugmented materials that have extraordinary properties.*

Single wall carbon nanotubes (SWCNTs) should be referred to as graphene nanotubes (GNTs) because each nanotube is an extremely thin rolled-up sheet of graphene. The superiority of graphene nanotubes is due to their exceptional properties, such as superior conductivity, high temperature resistance, strength and flexibility.

* Estimates based on report and analysis provided by one of the leading management consulting firms.

TUBALL™

While the huge potential of GNTs has been recognised for many years, until recently their wide application in industry was not possible because of an absence of technology for their mass production, their high price, and a lack of methods for introducing them into materials.

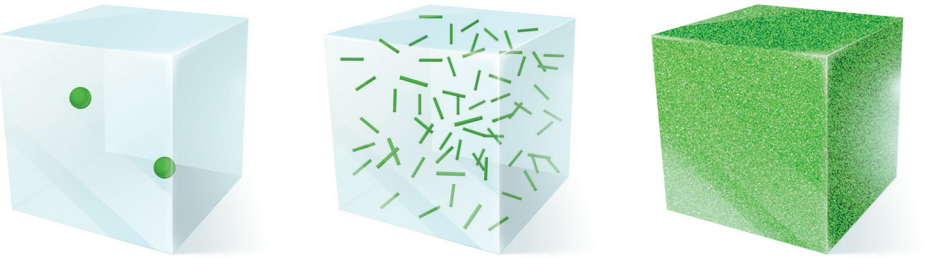
TUBALL™ nanotubes are the first GNTs to be available for commercial applications in a wide range of industries. OCSiAl's breakthrough yet low-cost mass-production technology has made the widespread use of nanotubes economically viable while still preserving their high quality.

FEATURES

- Best price-to-performance ratio compared with similar products
- Maintains color, elasticity, durability and other key properties
- Versatile for an extremely wide range of applications
- High-quality nanotubes (G/D ratio up to 120)
- Benefits start from ultralow concentrations
- Adds uniform, permanent and stable electrical conductivity
- Enhances mechanical properties of materials

HOW IT WORKS

TUBALL™ provides significant improvements in material properties upon the addition of ultralow loadings – starting from only 0.01%.



Microparticles | Nanofibers | GNTs

The same concentration of particles (~0.1%) in the same volume.

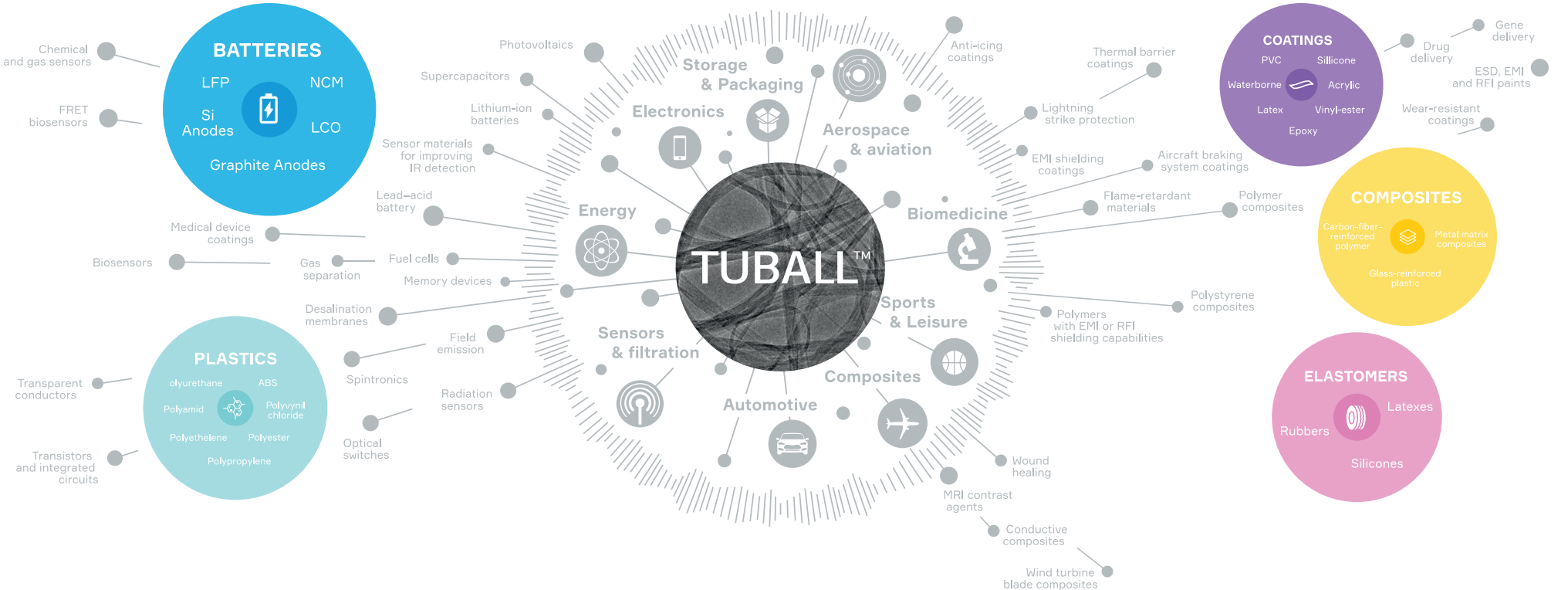
Unlike conventional additives such as multi wall carbon nanotubes, carbon fibers, and most types of carbon black that unevenly disperse in a material's matrix, GNTs create a 3D uniform reinforced and conductive network.

GRAPHENE NANOTUBES

TRULY UNIVERSAL MATERIAL

To easily and properly incorporate TUBALL™ into materials, OCSiAl has developed and successfully brought to market a line of pre-dispersed concentrates, masterbatches and suspensions that are compatible with various industry-standard formulations.

For more information on TUBALL™ application in a specific matrix, refer to the product listing in the catalog or contact the nearest OCSiAl office for assistance in selecting the right solution.



PRODUCTS FOR ENERGY STORAGE

TUBALL™ BATT

TUBALL™ BATT is a ready-to-use dispersion designed to easily incorporate TUBALL™ into electrode formulations during the battery manufacturing process.

TUBALL™ BATT provides a complete or partial substitute for carbon black in battery electrodes and can replace several percent of carbon black with 0.02–0.1% of TUBALL™.

TUBALL™ forms conductive 3D networks between active material particles at very low concentrations. The nanotubes reinforce the electrode structure and improve its mechanical stability during cycling. TUBALL™ improves adhesion by establishing strong ties between the particles, reducing the amount of binder required.

PRODUCTS FOR ENERGY STORAGE

PRODUCTS FOR ENERGY STORAGE

TUBALL™ BATT

Ultrafine TUBALL™ dispersion in H_2O for high-energy Si-based anodes.

CUSTOMER CASE

Customer: 3C battery maker

Product: Pouch cells for mobile phones

Why TUBALL™: Improving volumetric density of the battery is required

Dosage in recipe: 0.05%–0.1% of TUBALL™ in SiOx + graphite in anode slurry recipe

The result: 800 Wh/l volumetric density is achieved with a good cycle life performance

Creates a robust network inside the Si-anode and solves the problem of its degradation, allowing Li-ion battery makers to use record high quantities of silicon in the recipes of their cells for the first time and reach the desired energy density targets, as well as unlocking fast-charging capabilities. The key element of Si-based anodes in the majority of silicon anode projects worldwide.

FEATURES

- Compatible with the majority of state-of-the-art SiOx or Si/C anode recipes
- CMC or other binders available
- Low content of foreign impurities
- Ready, easy to use, efficient: proven by leading Li-ion battery makers

BENEFITS

SOLVES THE SI-ANODE DEGRADATION PROBLEM

20% SiO/C anodes with up to 600 mAh/g capacity thanks to TUBALL™ BATT H_2O result in a battery cycle life acceptable to the modern EV industry.

CYCLE LIFE THAT MEETS THE TARGETS OF THE MODERN EV INDUSTRY

Makes it possible to retain >80% capacity after 1,500 cycles.

RECORD HIGH ENERGY DENSITY ACHIEVABLE

Boosts energy density up to 300 Wh/kg and 800 Wh/l due to Si-anode enabling.

FAST-CHARGING ABILITY UNLOCKED

Up to 4C charge-rate achievable due to high silicon content enabled by TUBALL™.

TUBALL™ BATT

Ultrafine TUBALL™ dispersion in NMP for high-energy cathodes.

Unmatched TUBALL™ conductivity for improved battery safety and energy density now comes in an optimized, more cost-efficient dispersion.

FEATURES

- Dispersion optimized specially for cathodes
- More than 80% solids achievable
- Low Fe content
- Choice of PVDF possible
- Ready and easy to use

PRODUCTS FOR ENERGY STORAGE

CUSTOMER CASE

Company: Manufacturer of cylindrical batteries for various applications

Product: Cylindrical battery 18650

Why TUBALL™: Too much heat from high discharge rate mode as well as not enough power at lower temperatures

Dosage in recipe: 0.04%–0.08% of TUBALL™ in cathode slurry recipe

The result: DCR decreased significantly, improved continuous discharge rate at 0°C

BENEFITS

BOOSTED ENERGY DENSITY

Thanks to 10–60 times lower loading of conductive additive. Up to 98.8% active material content possible in dry electrode.

IMPROVED ADHESION

Two-times higher thanks to the bond strength between cathode particles.

HIGHER SAFETY

Increased safety due to two-times lower battery resistance increase (DCR).

HIGHER DISCHARGE POWER

Increases >50% at high discharge rates.

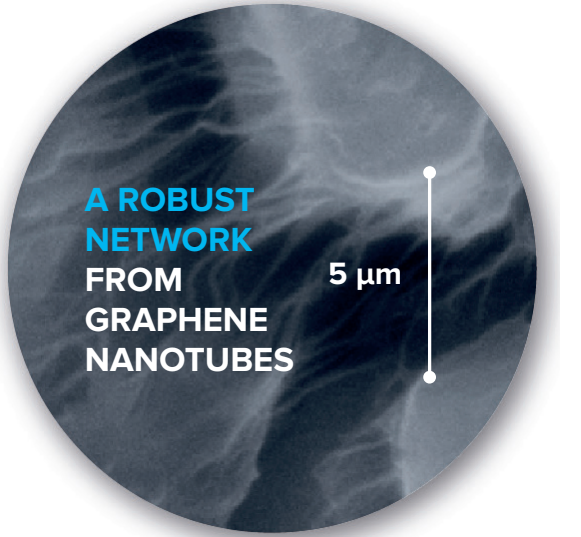
ANODES

TUBALL™ graphene nanotubes cover the surface of the silicon particles and create highly conductive and durable connections between them. These connections are so dense, long, conductive, and strong that even when the silicon particles in the anode expand and the material starts to crack, the particles stay well connected to each other through the TUBALL™ graphene nanotubes. This prevents the anode from going out of service—the hugely improved cycle life is enough to meet even the most strict EV manufacturer requirements.

PRODUCTS FOR ENERGY STORAGE

TUBALL™ UNLOCKS MASS PRODUCTION OF EV BATTERIES WITH SILICON ANODES

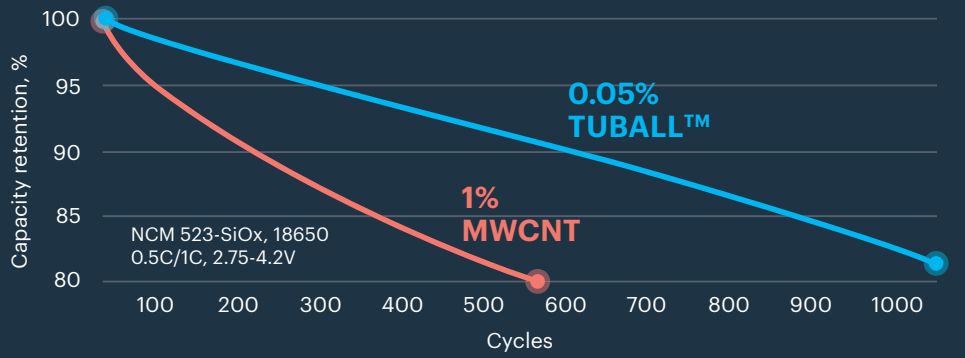
Bridging silicon anode particles and preventing their degradation during silicon volume expansion and cracking



TUBALL™ SOLVES THE SILICON ANODE PROBLEM, PREVENTING ITS DEGRADATION

Silicon-based anodes:
10% SiOx/SiC

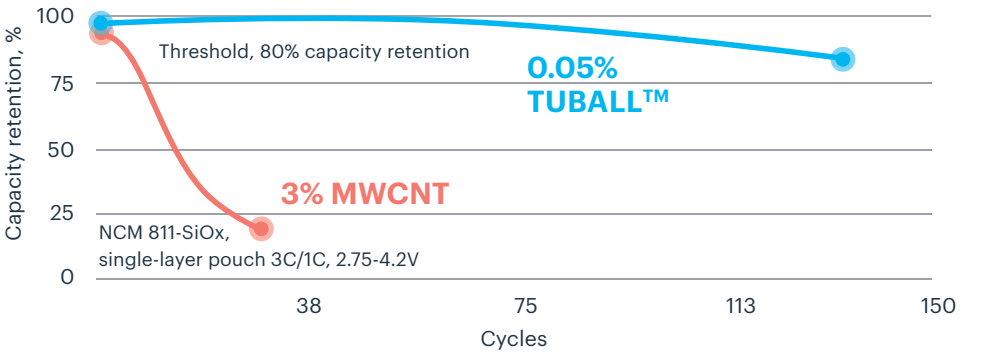
Drastically improved cycle life with small addition of TUBALL™.



PRODUCTS FOR ENERGY STORAGE

Silicon-based anodes:
90% SiOx/SiC

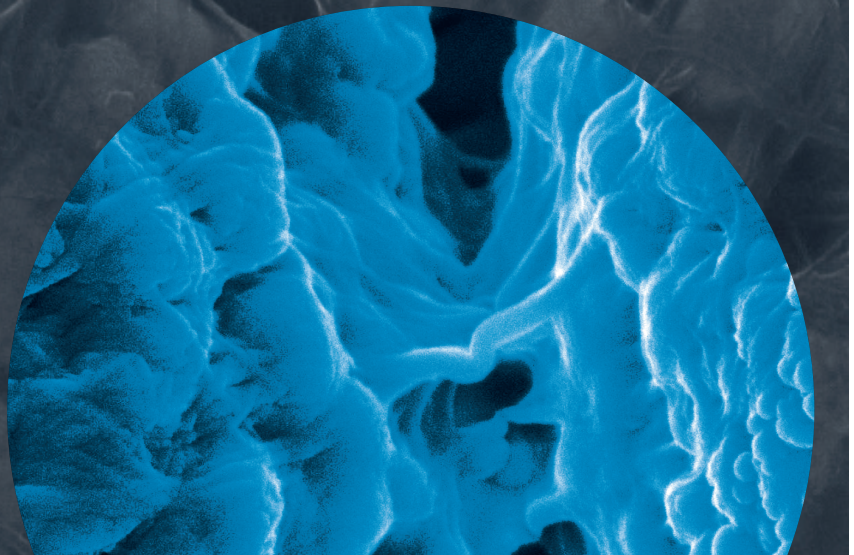
The more silicon in the anode, the more essential becomes the usage of graphene nanotubes in the design.
A higher content of silicon in the anode leads to higher anode volume expansion during cycling, thus the more essential it becomes to have a robust long–distance conductive network in the electrode keeping silicon anode particles connected to each other, which TUBALL™ is able to create in an unparalleled manner.



CATHODES

Robust long-distance electrical network from TUBALL™ nanotubes.

A robust TUBALL™ network works like a high-speed highway for electrons and makes it possible to achieve uniform low electrode internal resistance and improved durability of the electrode.



PRODUCTS FOR ENERGY STORAGE

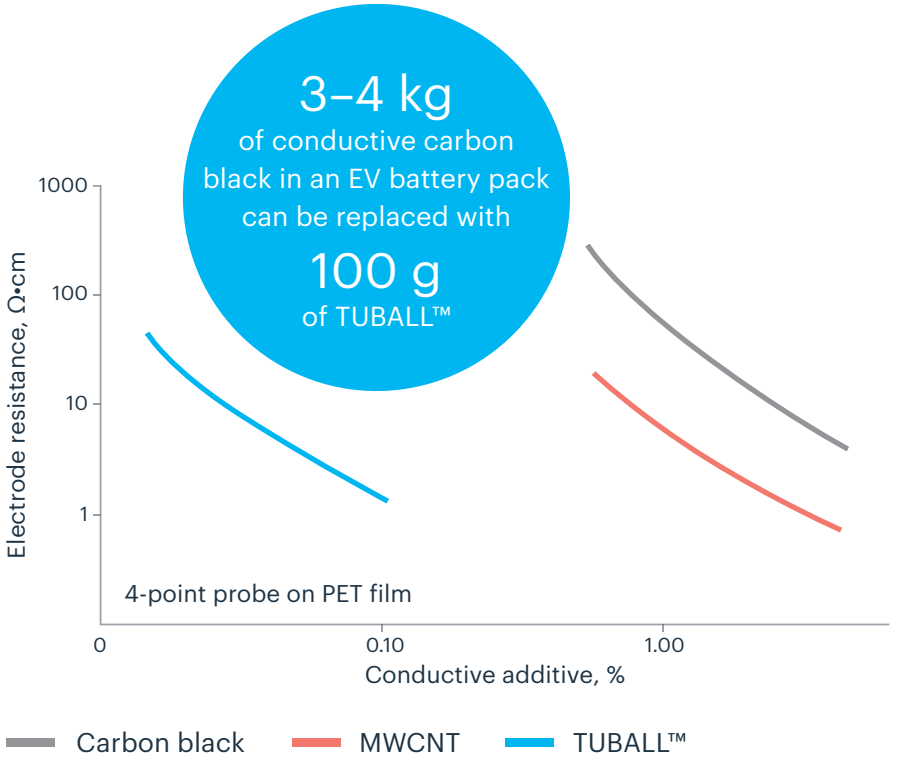
TUBALL™ NETWORK IMPROVES KEY PARAMETERS

In comparison with MWCNT and carbon black cathode formulas:

SAFETY	ENERGY DENSITY	DISCHARGE POWER	COHESION
higher due to	higher due to	higher	higher due to
2× lower battery resistance increase (DCR)	**10–60×** lower loading	**>50%** at high discharge rates >3C	**2×** increase in bond strength between cathode material particles

LOW DOSAGE EXAMPLE IN NCM

Less than 0.1% TUBALL™ graphene nanotubes provides higher energy density. This concentration is 10–60 times lower than that required when using multi-wall carbon nanotubes or carbon black as a conductive material.

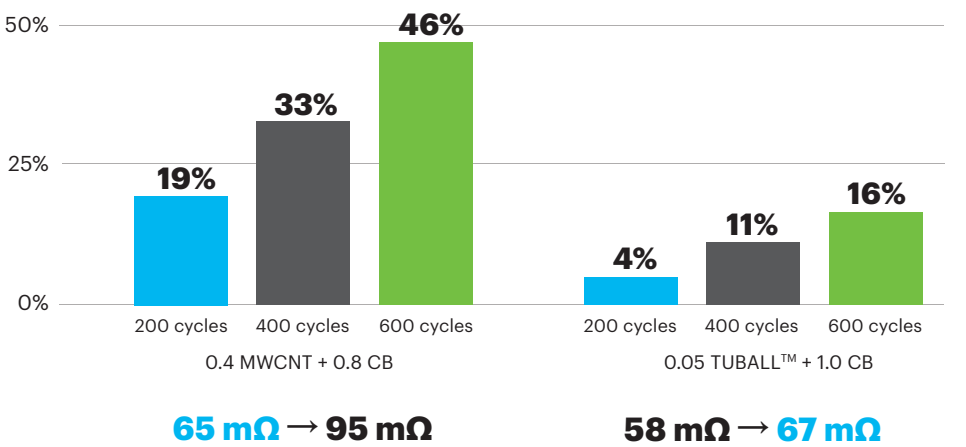


DCR IN NCM 811 EXAMPLE

The fact that TUBALL™ bundles create highly conductive longdistance routes for electrons between active material particles leads to the fact that even a small amount of TUBALL™ graphene nanotubes is enough to create well-developed conducive networks in the electrode at an ultralow working dosage and thus reduce internal battery cell resistance (DCR).

The lower battery DCR results in lower temperature buildup and thus a reduced risk of a battery fire. This is a crucial safety benefit made possible by TUBALL™ graphene nanotubes.

DCR increase during 45°C cell cycling



Formulation with TUBALL™ demonstrates significantly lower DCR increase. Cells with TUBALL™ reach initial DCR level of cells without it only after 600 cycles.

THICK CATHODES AND ANODES

Robust TUBALL™ network makes it possible to create electrodes with record high electrode thickness by strengthening the bond between active material particles.

No cracks in the electrode with TUBALL™ even at very high electrode loadings.

LFP example:

PRODUCTS FOR ENERGY STORAGE

DRY ELECTRODE COATING PROCESS

Ensuring uniform long-distance electrical connections between active material particles is of even greater importance in emerging dry electrode coating tech, as the average thickness of the electrodes is higher and the distribution of conductive additives is nonuniform.

TUBALL™ + PTFE composites make it possible to create robust, uniform networks.

PRODUCTS FOR ENERGY STORAGE

TUBALL™ BATT READY-TO-USE PRODUCTS FOR LIBs

	GNTs, %	DISPERSING AGENT, %	METAL IMPURITIES, PPM	DESCRIPTION
FOR CATHODES				
0.4% TUBALL™ BATT	0.4%	PVDF 2%	1–5	Fine TUBALL™ dispersion in NMP to reduce DCR, maximise energy density due to higher active material content, improve electrode cohesion and C-rate, increase electrode thickness.
1% TUBALL™ BATT	1%	PVDF 2%	1–5	Next generation of TUBALL™ dispersions in NMP with 2.5× higher TUBALL™ content. Cost-parity with high-quality MWNCT.
0.4% TUBALL™ BATT	0.4%	HNBR 0.4%	1–5	Ultrafine TUBALL™ dispersion in NMP that can reduce DCR and improve cycle-life even further. Recommended for LCO chemistries.
FOR Si/C ANODES				
0.4% TUBALL™ BATT	0.4%	CMC 0.6%	1–5	Fine TUBALL™ dispersion in H_2O. Improves cycle-life of SiOx, Si/C, and metallurgical Si anodes, enabling their industrial adoption in high-energy cells. Industry standard.
0.8% TUBALL™ BATT	0.8%	CMC 0.8%	1–5	Next generation of TUBALL™ dispersions in H_2O with 2× higher TUBALL™ content.

PRODUCTS FOR ELASTOMERS

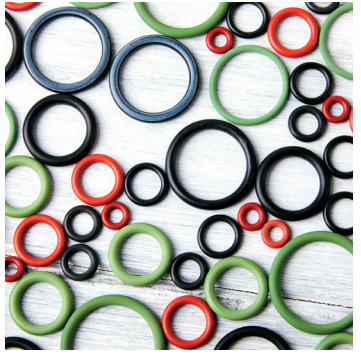
APPLICATION EXAMPLES

Non-marking solid tires

Cable accessories

Textile coatings

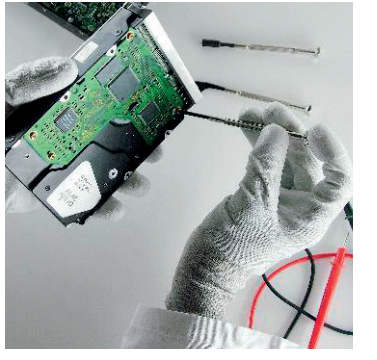
Conveyor belts and rollers



O-rings, hoses, jackets,
heat-resistant cords and plates

Pressure-sensitive
adhesive film

Rubber seals



ESD protective gloves
and PPE

PRODUCTS FOR ELASTOMERS

PRODUCTS FOR ELASTOMERS

TUBALL™ MATRIX FOR SILICONES

TUBALL™ MATRIX 601, 602 and 605 are nanotube concentrates specifically designed to provide superior electrical conductivity to silicone compounds (LSR – liquid silicone rubber, RTV – room temperature vulcanized rubber, and HCR – high consistency rubber) while retaining mechanical properties and minimally impacting the host matrix.

TUBALL™ MATRIX 601 / 602 / 605

PROPERTY — Electrical conductivity

TUBALL™ MATRIX 601

Carrier: polydimethylsiloxane oil

KEY APPLICATIONS

- LSR (liquid silicone rubber)
- RTV (room temperature vulcanised) silicones

TUBALL™ MATRIX 602

Carrier: vinyl-terminated polydimethylsiloxane

KEY APPLICATIONS

- LSR (liquid silicone rubber)
- RTV (room temperature vulcanised) silicones

TUBALL™ MATRIX 605

Carrier: silicone gum

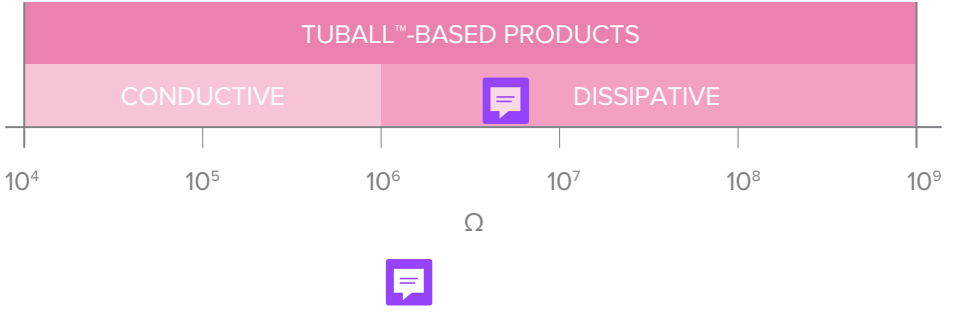
KEY APPLICATIONS

- HCR (high consistency rubber)

CONDUCTIVE SILICONES WITH TUBALL™ MATRIX

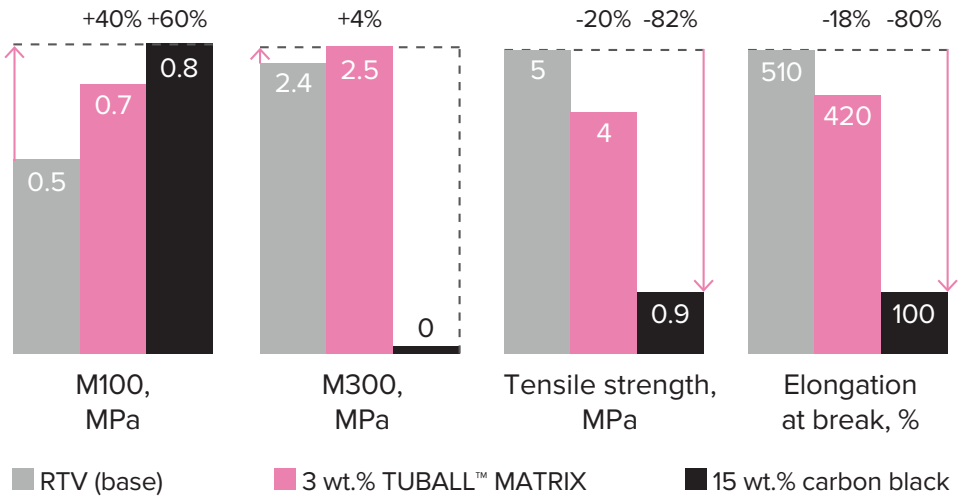
	Currently available	TUBALL™ MATRIX
Volume resistivity level	<100–10^8 Ω•cm	<100–10^8 Ω•cm
Concentration of conductive filler	30–70 wt.%	0.5–5 wt.%
Retain mechanical properties	No	Yes
Allow coloration	No	Yes

FULL RANGE OF RESISTIVITY



MECHANICAL PROPERTIES OF RTV WITH 3 wt.% TUBALL™ MATRIX 601 IN COMPARISON WITH CONDUCTIVE CARBON BLACK*

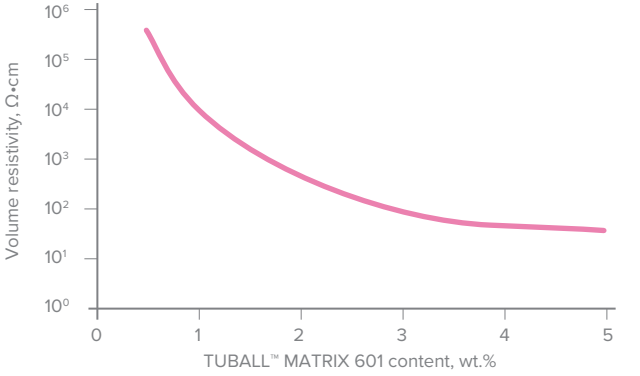
Volume resistivity 200 Ω•cm



TUBALL™ MATRIX makes it possible to produce conductive compounds without impairing flexibility or mechanical properties

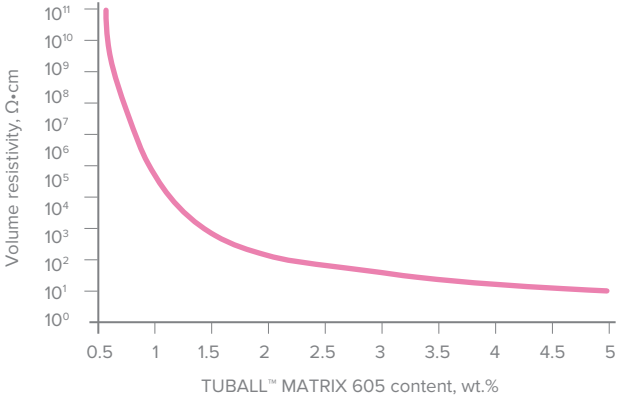
* Measurements conducted according to ASTM D412.
Study was conducted with conductive carbon black VULCAN® XC72R.

VOLUME RESISTIVITY OF LSR SILICONE WITH TUBALL™ MATRIX 601 IS IN THE RANGE 10–10^{16} Ω•cm*



* Tested in two-component RTV (basic viscosity 5,000 mPa.s), dilution in part A. Measurements conducted according to ASTM D991 standard.

VOLUME RESISTIVITY OF HCR SILICONE WITH TUBALL™ MATRIX 605 IS IN THE RANGE <10–10^{11} Ω•cm*



* Tested in HCR (Shore 60). Measurements conducted according to ASTM D991.

PRODUCTS FOR ELASTOMERS

TUBALL™ MATRIX FOR RUBBERS

TUBALL™ MATRIX 600-x series are nanotube concentrates designed to impart required electrically conductive properties to rubbers and to significantly enhance their mechanical properties.

TUBALL™ MATRIX 610 / 620.3

PROPERTY — Electrical conductivity

TUBALL™ MATRIX 610

Carrier: Polymer, paraffinic mineral oil

KEY APPLICATIONS

- EPDM

TUBALL™ MATRIX 620.3

Carrier: Polymer, TDAE oil

KEY APPLICATIONS

- NR
- BR

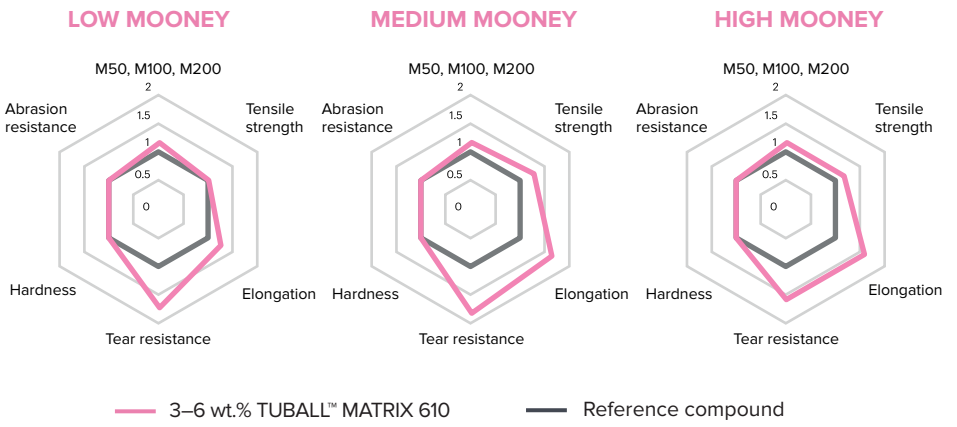
FEATURES OF TUBALL™ MATRIX FOR RUBBERS:

- Suitable for anti-static, static dissipative, and conductive applications
- Extremely low loadings of nanotubes that preserve properties
- Retain mechanical properties including softness
- Maintain rheology and viscosity
- Standard processing and mixing equipment
- Allows for colored ESD compounds

Ensuring long service life and stable conductive properties to crucial products and processes, nanotube-modified rubbers are widely used in the electronics, automotive, and tire, oil & gas, and other industries.

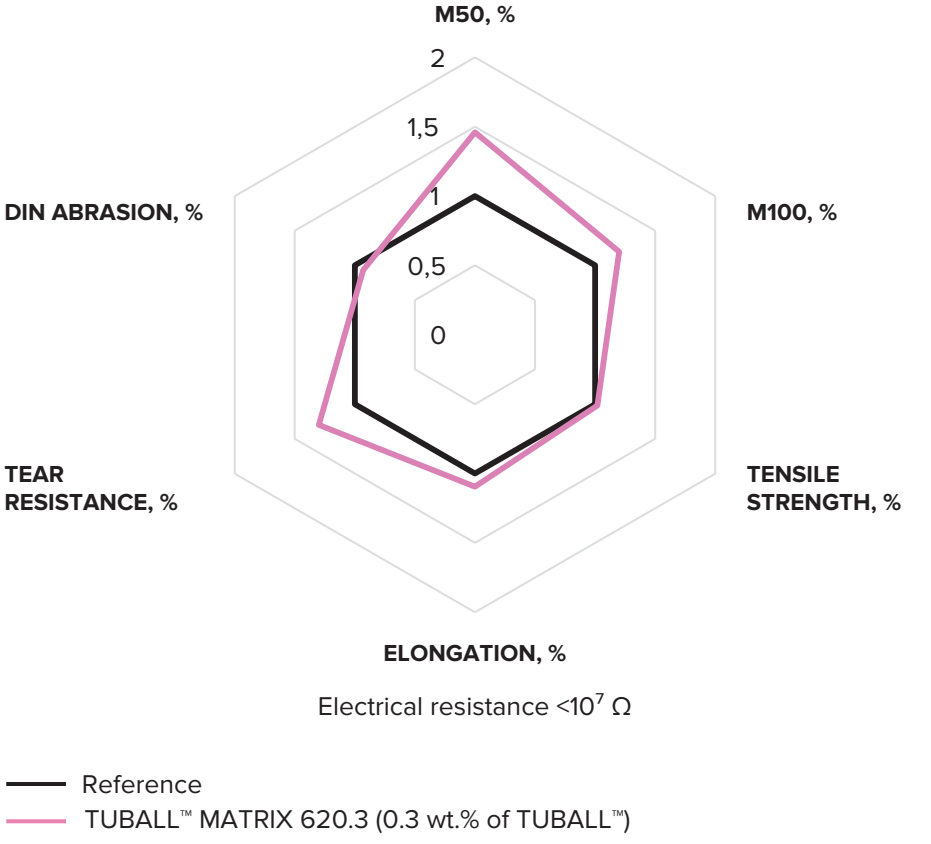
OCSiAl has developed a variety of products based on TUBALL™ graphene nanotubes for EPDM, NBR, SBR, blends of NR/BR, FKM, and other types of rubbers.

IMPROVEMENT OF TEAR STRENGTH AND TENSILE PARAMETRS EVALUATION IN 3 VISCOSITY TYPES OF EPDM



- M50, M100, M200 increased by 15–20%
- Tensile strength increased by 16–23%
- Tear resistance increased by 25–103%
- Abrasion resistance increased by 3–11%
- No drawback in elasticity
- Electrical restivity 10^6–10^9 Ω·cm

MECHANICAL PROPERTIES OF ANTI-STATIC NON-MARKING NR/BR SILICA BASED COMPOUND WITH TUBALL™ MATRIX 620.3



PRODUCTS FOR ELASTOMERS

TUBALL™ LATEX

TUBALL™ LATEX is a water-based suspension for manufacturing latex gloves and latex products with anti-static properties, while retaining mechanical properties and minimally impacting the host matrix.

TUBALL™ LATEX makes it possible to attain permanent and humidity-independent conductivity that is fully compliant with the most demanding applications, including the new European standard EN 16350:2014 (EN 1149) for anti-static properties in safety wear.

TOUCHSCREEN OPERATION WITH INDUSTRIAL GLOVES

TUBALL™ graphene nanotubes provide an anti-static effect that allows smooth operation of touchscreens without gloves having to be removed and that ensures worker and product protection.

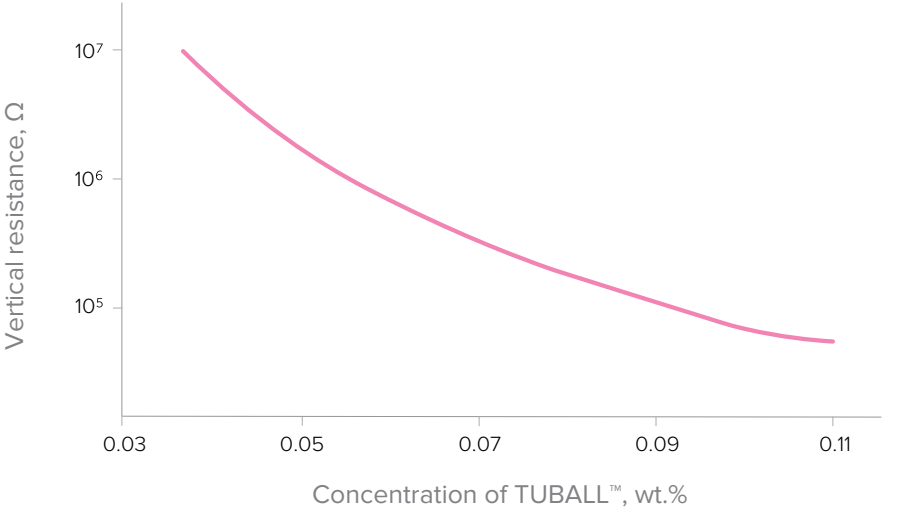
KEY BENEFITS

- Stable ESD properties according to international standards for protective wear
- Standard liners without conductive yarns
- No changes in formulation or dipping process
- Allows coloration

PRODUCTS FOR ELASTOMERS

ANTI-STATIC NITRILE LATEX WITH TUBALL™

	Current solutions	Results with TUBALL™
Specific resistance level	10^7–10^{11} Ω	10^2 –10^{11} Ω
Concentration of conductive filler	5–25 wt.%	0.03–0.075 wt.%
Negative impact on mechanical properties	Yes	No
Color retention	No	Yes



Measurement of electrical resistivity according to EN 16350:2014 carried out on teraohmmeter: TO-3 cable; electrode type - TE 50 for textile measurement (DIN 54345-1, DIN EN 1149-1 and DIN EN 1149-2)

ESD GLOVES WITH TUBALL™
AVAILABLE FOR ALL LATEX TYPES

LINER PU GLOVE
industrial
0.06 wt.%

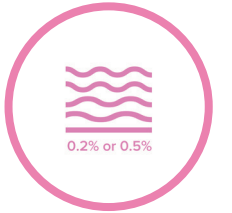
NITRILE LATEX GLOVE
cleanroom
0.06 wt.%

LINER NITRILE GLOVE
industrial
0.06-0.1 wt.%

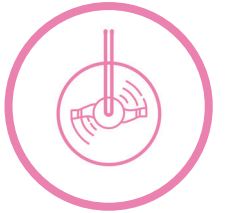
ELECTRICAL RESISTANCE 10^7 Ω

Uniform and stable anti-static properties
with color according to EN 16350

HOW TO MAKE YOUR GLOVES CONDUCTIVE WITH TUBALL™



User-friendly water-based dispersion
available in two concentrations of TUBALL™



Standard compounding and dipping process

Touchscreen gloves compliant with international
standards for protective wear

PRODUCTS FOR ELASTOMERS

TUBALL™ GRAPHENE NANOTUBE SOLUTIONS FOR ELASTOMERS

PRODUCT	CARRIER MEDIUM	TARGET SYSTEMS						
		LSR silicone	RTV silicone	HCR silicone	EPDM	NR	BR, IR, SBR	NBR, PU, NR latex
SILICONES								
MATRIX 601	Polydimethylsiloxane	●	●					
MATRIX 602	Siloxanes and silicones vinyl group-terminated	●	●					
MATRIX 605	Siloxanes and silicones vinyl group-terminated			●				
LATEX								
LATE	Water + anionic surfactant (sodium salt of polynaphthalene sulfonic acid)							●
RUBBERS								
MATRIX 610	Polymer, paraffinic mineral oil				●			
MATRIX 620	Polymer + plasticizer					●	●	

PRODUCTS FOR COMPOSITES & COATINGS

PRODUCTS FOR COMPOSITES & COATINGS

TUBALL™ MATRIX 200 / 300-X SERIES

TUBALL™ MATRIX 200 / 300-x series are graphene nanotubes concentrates designed to provide permanent, uniform electrical conductivity to various thermoset materials: epoxy, polyurethane, polyester, etc. TUBALL™ MATRIX is compatible with a variety of color shades while meeting ESD standards.

APPLICATION EXAMPLES

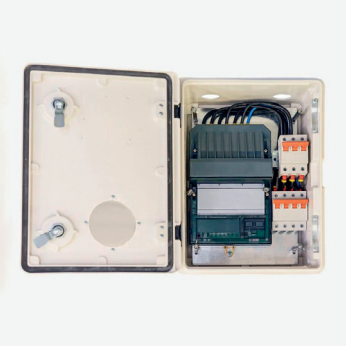
GFRP pipes and tanks

Transparent anti-static films

Epoxy and PU anti-static flooring

Gelcoats and moldcoats

Industrial rollers



Housing/packaging for sensitive electronics, and combustible powders or liquids

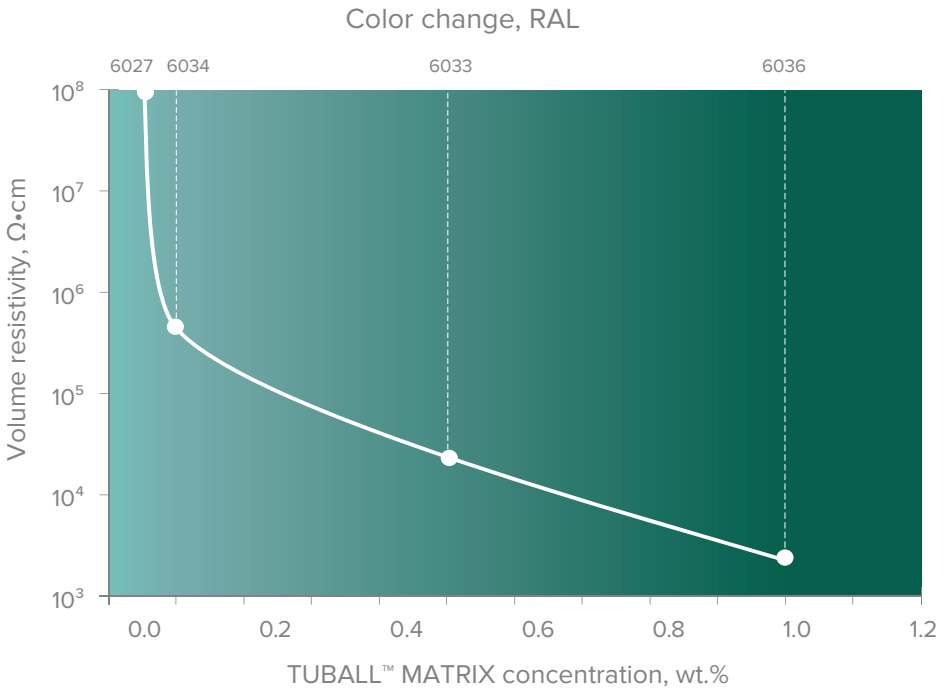
Lining coatings

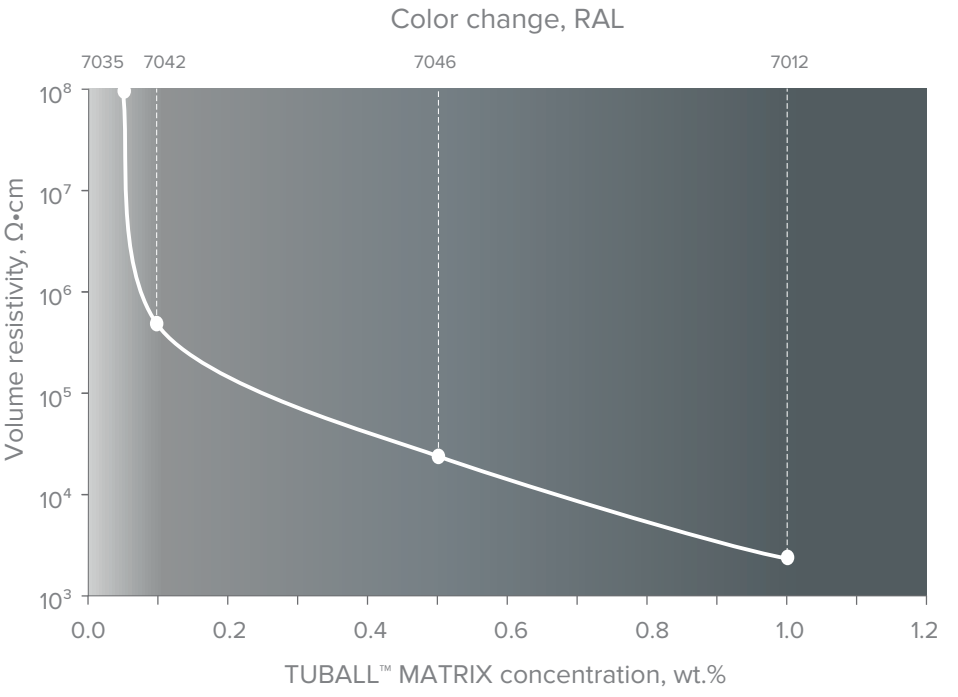
Powder coating

PRODUCTS FOR COMPOSITES & COATINGS

PRODUCTS FOR COMPOSITES & COATINGS

TUBALL™ MATRIX CONDUCTIVITY AND COLOR





Note: all samples include 5 wt.% of TiO_2 as a whitening agent.
Results for epoxy resin D.E.R. 351. ASTM D257

TUBALL™ COAT_E

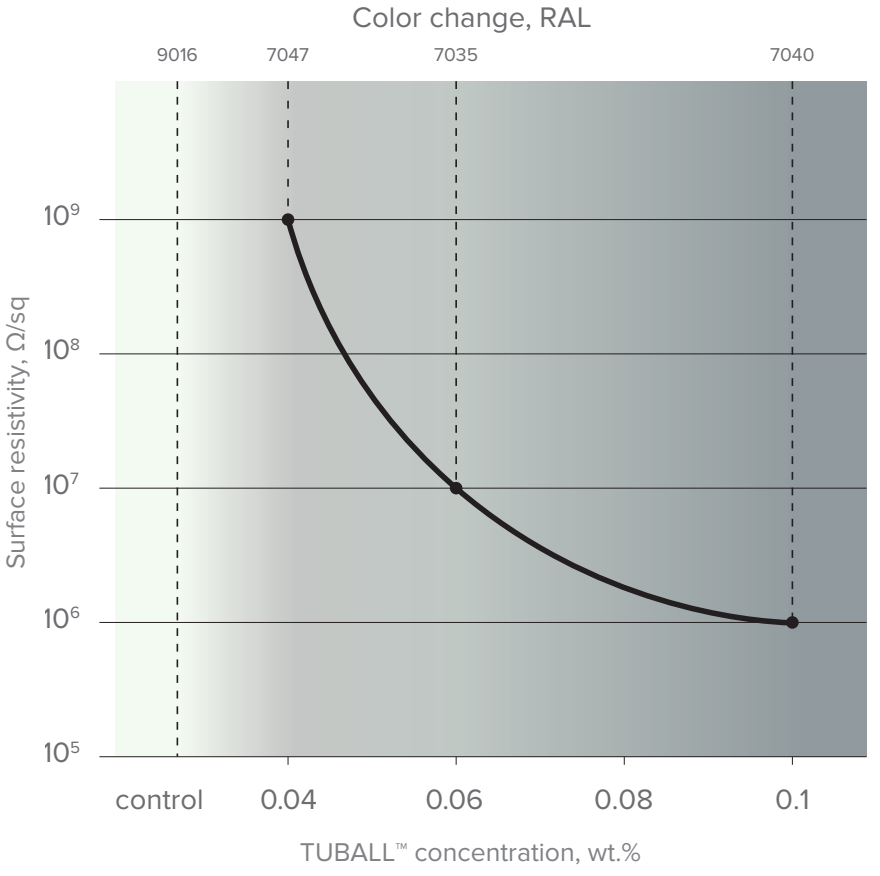
TUBALL™ COAT_E is an easy-to-use graphene nanotube suspension in water that provides permanent anti-static properties to waterborne paints and coatings with minimal impact on their color and mechanical properties.

TUBALL™ COAT_E is suitable for production of anti-static waterborne paints and coatings intended for the following applications:

- UV coating
- Packaging for electronics
- PU and acrylic-based coatings
- Glass coating

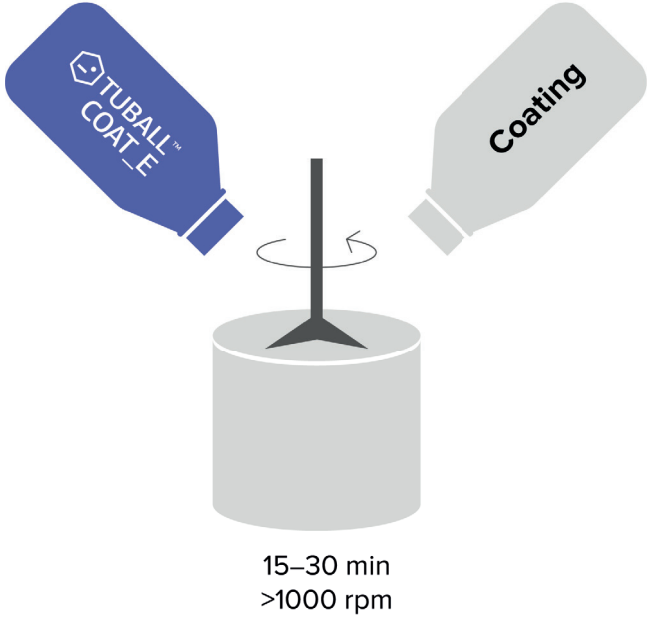
PRODUCTS FOR COMPOSITES & COATINGS

TUBALL™ COAT_E IS SUITABLE FOR COLORED AND TRANSPARENT SYSTEMS



Permanent electrostatic dissipative and conductive properties with color and/or transparency are achieved by simply mixing TUBALL™ COAT_E with the paint system.

- Easy to use
- Efficient ESD protection
- Permanent conductivity
- Suitable for colored and transparent systems



PRODUCTS FOR COMPOSITES & COATINGS

TUBALL™ GRAPHENE NANOTUBE SOLUTIONS FOR COMPOSITES & COATINGS

PRODUCT	CARRIER	COMPOSITION	Target systems															
			Solvent-free				Solvent-based							Water-based				
			Epoxy	Polyester	Vinyl-ester	Polyurethane	Epoxy	Polyester	Vinyl-ester	Polyurethane	Melamine	Phenolic resoles	Acrylic	Epoxy	Polyurethane	Acrylic	Phenolic resoles
TUBALL™ MATRIX concentrates (black flake paste @ standard dosage 0.1%–1.0%)																		
MATRIX 201	Plasticizer	Fatty acid glycidyl ester (2,3-epoxypropyl neodecanoate, CAS-No. 26761-45-5)	●															
MATRIX 202	Plasticizer	Fatty carboxylic acid ester derivatives				●												
MATRIX 203	Plasticizer + stabilizing agent	Fatty acid glycidyl ester (2,3-epoxypropyl neodecanoate, CAS-No. 26761-45-5) + (polymer + ammonium salt of polyolefins-based derivative (CAS-No. 398475-96-2))					●			●								
MATRIX 204	Plasticizer + stabilizing agent	Triethylene glycol dimethacrylate (CAS-No. 109-16-0) + ammonium salt of polyolefins-based derivative (CAS-No. 398475-96-2)		●	●			●	●	●	●		●					
MATRIX 207	Plasticizer	Alkyl glycidyl ether (Oxirane, mono[(C12-14-alkyloxy)methyl] derivative, CAS No. 68609-97-2)	●															
MATRIX 208	Plasticizer + stabilizing agent	Alkyl glycidyl ether (Oxirane, mono[(C12-14-alkyloxy) methyl] derivative, CAS-No. 68609-97-2) + ammonium salt of polyolefins-based derivatives (CAS-No. 398475-96-2)					●			●								
MATRIX 209	Plasticizer	Fatty carboxylic acid ester derivatives				●												
MATRIX 301	Surfactant	Ethoxylated alcohol (C12-15-branched and linear, ethoxylated propoxylated, CAS No. 120313-48-6)	●			●												
MATRIX 302	Surfactant + stabilizing agent	Alkylene glycol derivative + stabilizing agent ((disodium 2,2'-([1,1'-biphenyl]-4,4' diyldivinylene) bis (benzenesulphonate, CAS No. 27344-41-8))										●			●	●	●	
TUBALL™ suspensions COAT_E (black liquid @ standard dosage 1.5%–6.4%)																		
COAT_E	Water + anionic surfactant	Water + anionic surfactant (sodium dodecylbenzenesulfonate, CAS No. 25155-30-0)												●	●	●		
COAT_E	Water + distyrylbiphenyl-derivative	Water + distyrylbiphenyl-derivative, (CAS No. 27344-41-8)												●	●	●		

PRODUCTS FOR THERMOPLASTICS

PRODUCTS FOR THERMOPLASTICS

TUBALL™ MATRIX 800-X SERIES

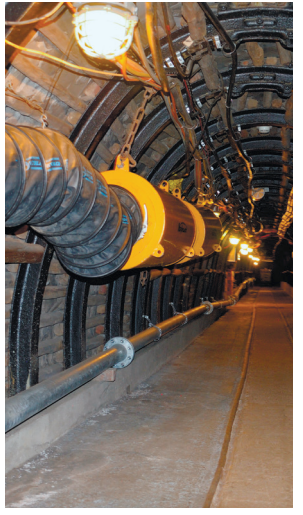
TUBALL™ MATRIX 800-x series is a line of concentrates based on TUBALL™ graphene nanotubes that has been specifically designed to provide superior electrical conductivity to thermoplastic materials, while retaining mechanical properties and minimally impacting the host matrix.

TUBALL™ MATRIX 800 line is designed for the most demanding applications in the automotive, petrochemical, oil and gas, healthcare, pharmaceutical and electronics industries.

PRODUCTS FOR THERMOPLASTICS

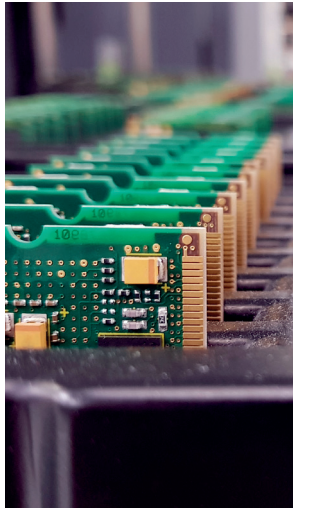
APPLICATION EXAMPLES

ESD containers

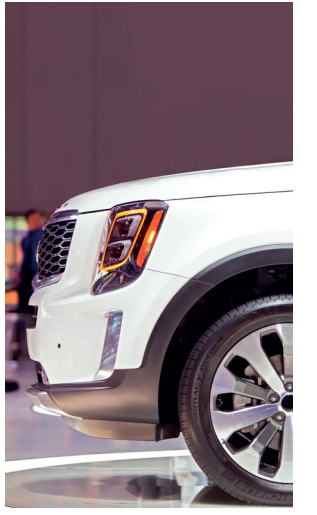


Ventilation ducting

Anti-static textiles



ESD-sensitive trays for electronics



Conductive compounds for e-painting

Glass fiber filled thermoplastics injection molded parts

PRODUCTS FOR THERMOPLASTICS

TUBALL™ FOR THERMOPLASTICS

PRODUCT	CARRIER	Form*	Target systems														
			Polyethylene	PE rotomolding	Polypropylene	PVC	Thermoformed HIPS	TPU	GF PPS	ABS	PC	PC-ABS	PA	GF filled PA	GF filled PBT	Powder coatings	PET
TUBALL™ MATRIX concentrates (pellets or black flake paste @ standard dosage 0.3%–3.0%)																	
MATRIX 808	Polyol ester	PLT					●	●	●	●	●	●	●	●	●		
MATRIX 814**	Epoxidized fatty acid glyceride + stabilizing agent (CAS-No. 162627-31-8, CAS-No. 64742-55-8)	PST				●											
MATRIX 815 beta	Polyethylene wax	FLK	●	●	●											●	
MATRIX 821 beta	Reaction mass of fatty acids, montan-wax, ethylene esters	PLT	●	●	●		●	●	●					●		●	●
TUBALL™ suspensions COAT_E (black liquid @ standard dosage 1.5%–6.4%)																	
COAT_E	Water + anionic surfactant (sodium dodecylbenzenesulfonate, CAS-No. 25155-30-0)	SPSN		●													

~~* PLT – pallets, PST – paste, FLK – flakes, SPSN – suspension~~

** PVC plastisol specific

Based on Selection Guide V09

TUBALL™ MATRIX 808 / 814

PROPERTY — Electrical conductivity

TUBALL™ MATRIX 808

Carrier: polyol ester

Materials: GF filled PA, PA, GF filled PPS, PC, PC-ABS, ABS, Thermoformed HIPS, GF filled PBT, TPU

Working dosage: 0.5–2.5 wt.%

Shape: pellets

TUBALL™ MATRIX 814

Carrier: epoxidized soybean oil and polymeric stabilizing agent

Materials: PVC-plastisol

Working dosage: 0.5–2.5 wt.%

Shape: paste

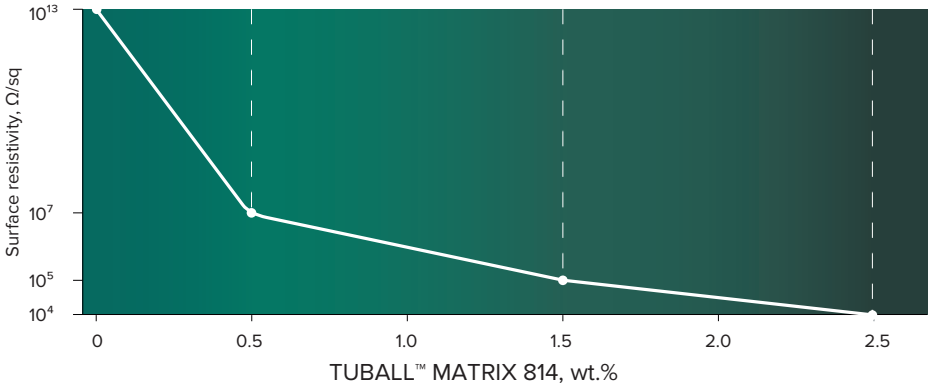
FEATURES OF TUBALL™ MATRIX FOR THERMOPLASTICS:

- Provides thermoplastic compounders with opportunities to develop new conductive products
- Surface resistivity of 10^8–10^9 Ω/sq*
- Volume resistivity of 10^3–10^9 Ω·cm*
- Maintains good balance of mechanical properties
- Stable performance reducing the number of out-of-spec parts
- Permanent homogeneous resistivity without “hot spots”
- Good processability
- High surface quality
- Allows production of conductive parts that retain colors
- Freedom to incorporate other functional ingredients

* Dosages and values can vary depending on the formulation, processing and products. The shown values are mentioned as the typical reference

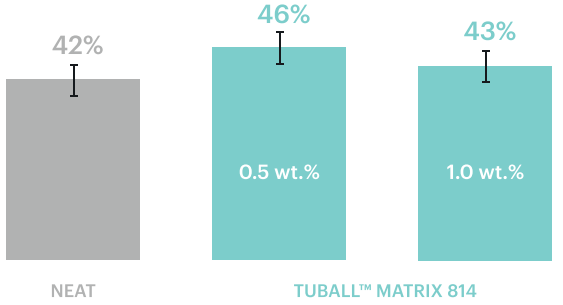
APPLICATION EXAMPLE: CONDUCTIVE PVC-PLASTISOL

TUBALL™ MATRIX 814 provides a full range of electrical resistivity, while allowing a wide range of colors to meet customer requirements.



ABRASION RESISTANCE INDEX

TUBALL™ MATRIX 814 maintains and even improves the mechanical properties of conductive PVC-plastisol compounds.

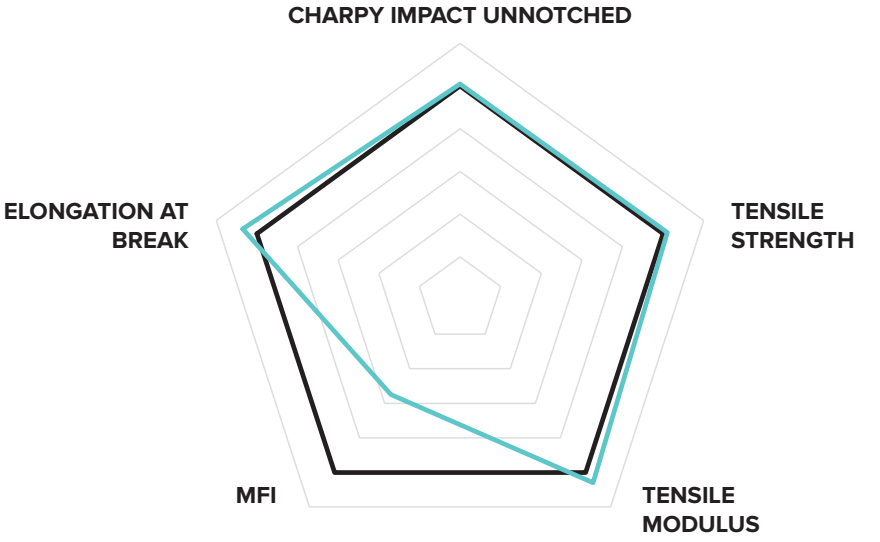


OCSiAl internal PVC plastisol formulation. ASTM D5963-04.

APPLICATION EXAMPLE: CONDUCTIVE GLASS FIBER-FILLED POLYAMIDE

TUBALL™ MATRIX provides a full range of electrical resistivity while maintaining mechanical properties.

Surface resistivity 10^{5}–10^{7} Ω/sq **Volume resistivity** 10^{3} Ω·cm



OCSiAl internal study. Injection molded samples. Values can vary depending on processing, products and glass fiber content.

COMPANY

OCSiAI

OCSiAl at a glance

50
countries

24
nationalities

>120
patents

3
R&D centers

>20
dealers

400
employees

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SAFETY INFORMATION

OCSiAl produces nanotube dispersions and concentrates to enable a simple and easy integration process. TUBALL™ MATRIX products and TUBALL™ suspension products were developed to minimize handling requirements and provide all manufacturers access to the superior performance of graphene nanotubes.

For handling and safety information please refer to the Safe Handling guide.

More at **tuball.com**

CONTACT US TO ORDER A SAMPLE AND OBTAIN TECHNICAL/SAFETY DATA SHEETS

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