

Reinste Nano Ventures Pvt. Ltd.

Designed to deliver the purest.....

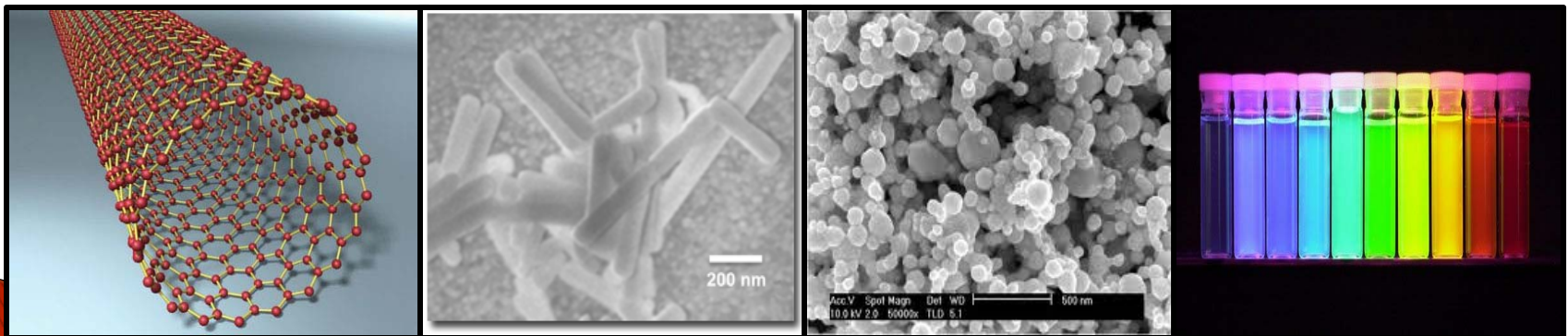
**Nanotechnology Applications
in
Construction Industry**



About Us

Reinste Nano Ventures emphasizes the significance of purest Nanomaterials with uniform composition free from any adulterants for class research and production purposes.

- Finest research Grade of nanomaterials
- Largest type of nanomaterials repository
- Custom synthesis of required nano particles
- Tie-ups with renowned and innovative new generation nanotechnology companies
- Brings high grade nanotechnology and products in India



Construction Industry

Construction Industry is one of the most booming industries in the whole world. This industry is mainly an urban based one which is concerned with preparation as well as construction of real estate properties. The repairing of any existing building or making certain alterations in the same also comes under Construction Industry.



Construction Industry & Nanotechnology

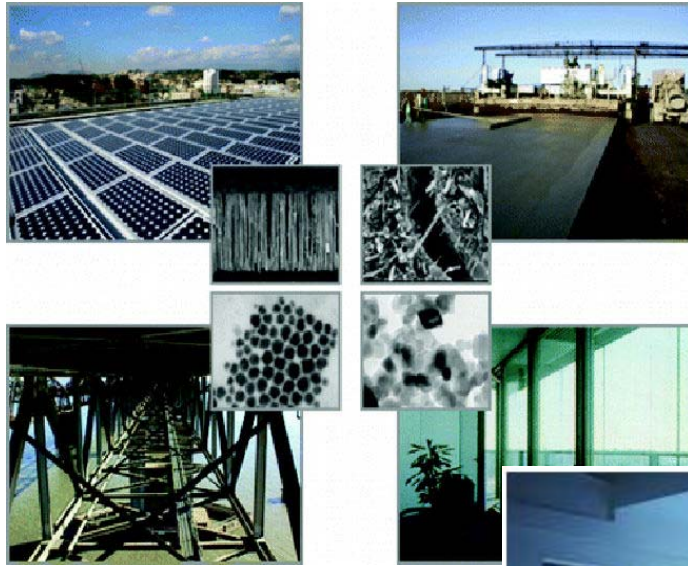
Nanomaterials offer many improved performance properties for adhesives, concrete, coatings, flooring, glass, lighting equipment, plumbing fixtures and other construction products.

Construction Industry has undergone tremendous change in the past two centuries. What affected it most was the *industrial revolution* and its *resultant outcome* in terms of

- ✓ steel,
- ✓ cement and
- ✓ other building materials.

The twentieth century saw further refinement in the same with even more *sophisticated techniques and devices*. Now, it has to move in the next phase where inputs are *less and lighter*, they are *smooth and sturdier*; they are *cost effective, cleaner and sustainable*. It has to move towards more sophistication with the help of emerging technologies like the *Nanotechnology*.

Construction Industry & Nanotech.....



Nanomaterials in Different Construction Materials

Various Protective Nanocoatings



Nanomaterials: Taking Construction beyond Bricks & Mortar

- ✓ Nanomaterials are poised for widespread use in the construction industry, where they can offer significant advantages for a variety of applications ranging from making more durable concrete to self-cleaning windows.
- ✓ The *extraordinary chemical and physical properties* of materials at the nanometer scale enable novel applications ranging from *structural strength enhancement and energy conservation* to antimicrobial properties and self-cleaning surfaces.
- ✓ Various Nanomaterials (MNMs) and Nanocomposites are being considered for various uses in the construction and related infrastructure industries.
- ✓ At the nanoscale, these materials can behave differently from their conventional scale counterparts, which creates exciting new prospects in a variety of construction applications.

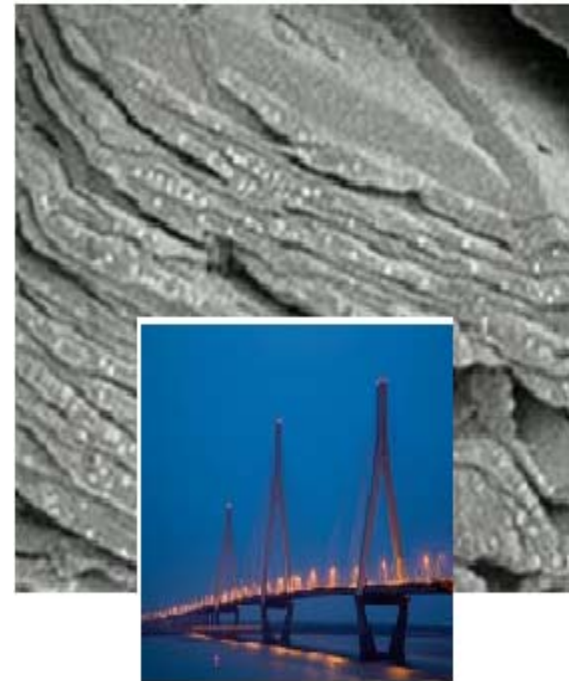
Various Nanomaterials in Building Materials

The main Nanomaterials which could be used in Construction materials are:

✓ Nano Silica (SiO_2)

Nano Silica mixed in Concrete can improve:

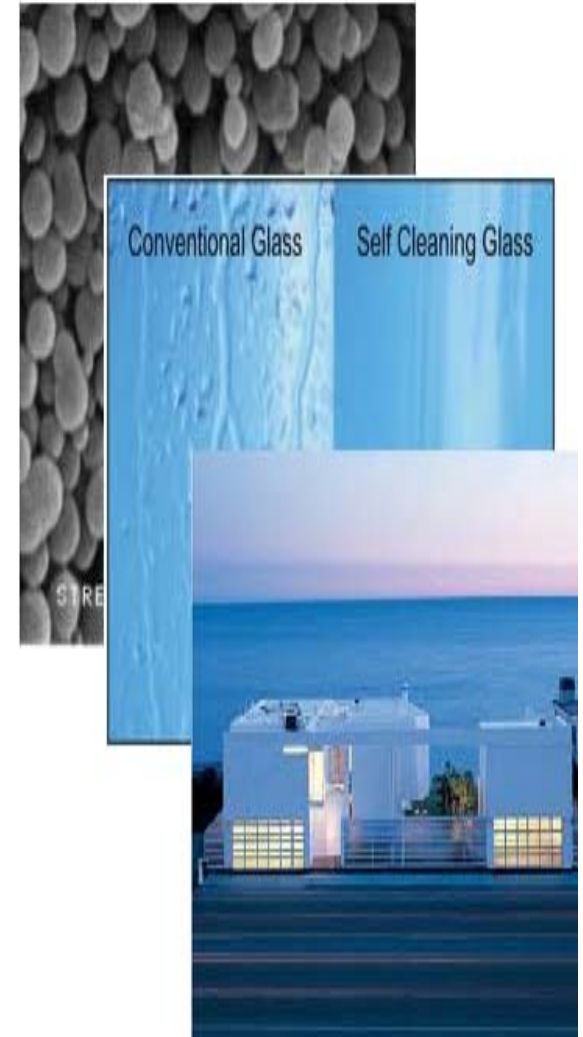
- *Mechanical Properties*
- *Can Control the degradation of the fundamental C-S-H (Calcium-Silicate-Hydrate) reaction of concrete.*
- *Can block water penetration and therefore lead to improvements in durability.*
- *They also increase strength as well as offering the benefit of monitoring stress levels through the measurement of section electrical resistance.*



✓ *Titanium Dioxide (TiO₂)*

Titanium Dioxide Nanopowder added to concrete can give:

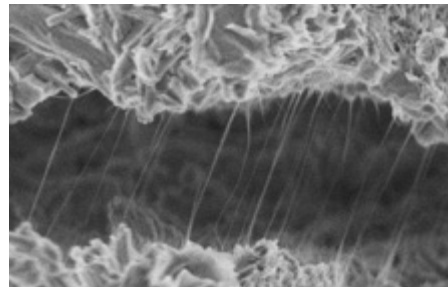
- *Used for its ability to break down dirt or pollution and then allow it to be washed off by rain water on everything from concrete to glass.*
- *TiO₂ is a white pigment and can be used as an excellent reflective coating.*
- *It is incorporated, in sun-block to block UV light and it is added to paints, cements and windows for its sterilizing properties since TiO₂ breaks down organic pollutants, volatile organic compounds, and bacterial membranes through powerful catalytic reactions.*
- *It gives self cleaning properties to surfaces to which it is applied.*



✓ *Carbon Nanotubes (CNT)*

Carbon Nanotube addition to concrete can give the benefits like:

- *CNT is used to strengthen and monitor concrete.*
- *The addition of small amounts (1% wt) of CNT's can improve the mechanical properties of samples.*
- *Oxidized multi-walled nanotubes (MWNT's) show the best improvements both in compressive strength (+ 25 N/mm²) and flexural strength (+ 8 N/mm²)*



Nanocoatings: For Protection & Heat Insulation

Coatings are expected to constitute the largest application for nanomaterials in construction. Architectural paints, water sealers and deck treatments, and treatments applied during fabrication, such as scratch-resistant coatings on vinyl or wood flooring are meant for protection.

Various Nanocoatings can provide:

- *Fire Protection*
- *Heat Insulation*
- *Corrosion Protection*

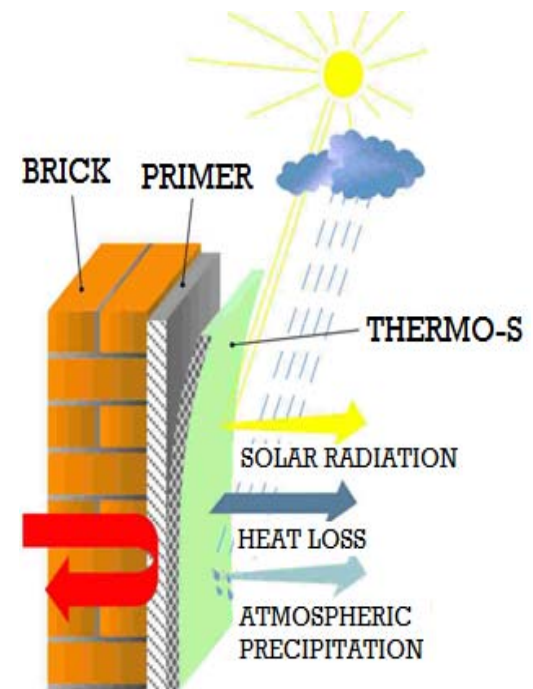
Materials we have for Construction Industry

✓ Fire Protective & Heat Insulating Coatings

□ “Thermo-S” is a real alternative to all Heat-insulating Technologies

Advantages:

- *The coating can be applied on metals, plastics, concrete, brick, wood and any other brick building material in any dry weather.*
- *Provides excellent protection against frost penetration.*
- *Protects the surface against condensate appearing.*
- *Features excellent repair capability.*
- *Does not sustain the burning and stops spreading the flame.*
- *Reduces financial and energy expenditures.*
- *Greatly enlarge the operation life of pipelines.*
- *Is ecologically safe.*



Thermo-S: Product Description

- **THERMO-S is an atmospheric-resistant energy-efficient paint-coating consisting of microscopical ceramic balls which are in a suspension state in a liquid composition of synthetic rubber, polymers and inorganic pigments.**
- **This can provide the ultimate economical effect while solving any heat, noise damp, proof problem as well as corrosion and fire resistance.**
- **The Product can be manufactured on the fabric in a flexible roll or deposited onto plates of required thickness & quality.**

Technical Indicators

Name	Value
Appearance of composition	White Suspension
Appearance of coating	Uniform, White
Performance Temp Range	From -60 to +260
Adhesion to Steel, MPa	1.0
Tensile Strength, Mpa	2.0

❑ Blister-DM: Heat insulating atmosphere-resistant coating

Advantages:

- The coating can be applied on metal, plastic, concrete, brick, wood.
- Can isolate the working surface from water and air.
- Increases Anticorrosive protection.
- Withstands fuels and lubricants, dissolvents, alkaline and acid solutions.
- Is ecologically safe.
- Blister-DM provides Group 4 fire protection efficiency on metals & Group 1 fire protection efficiency of wood.



Blister-DM: Product Description

- It is designed for inner & outer applications of surfaces from metal, wood, brick and other surfaces in the living, public and production facilities as well as supply pipelines, tanks, storage buildings.
- The coating is liquid compounding on the basis of organic solvents and consisting of polymers, inorganic pigments and modified functional additives improving rheological and adhesive characteristics of the coating.

Technical Indicators

Name	Value
Appearance of composition	White Suspension
Appearance of coating	Uniform, White
Paint-coating flow-rate, l/sq. m (without allowing losses)	Group 4 fire protection on metals Group 1 fire protection on wood

✓ *Protective Coatings*

Nanocomposite coatings designed to enhance wear and abrasion resistance, UV-protection, and other functional properties.

➤ Self-healing Coatings

- *“Mend-M” self-healing clearcoat technology provides a durable, long lasting finish for metal substrates.*
- *“Mend-MW” self-healing polyurethane dispersion is made from polyurethane matrix. Coatings made from this dispersion exhibit self-healing properties. An added advantage of this waterborne dispersion is that it is solvent free with zero VOC.*
- *“Mend-W” self healing coating provides a long lasting, low maintenance finish for wood. Self-healing functionality allows for a high degree of scratch repair and gloss recovery, even in repeatedly damaged areas.*

➤ Abrasion Resistance Coatings

- *“Hardcoat SR-100” fulfills the need for abrasion or scratch resistant coatings on plastic substrates.*
- *It is a liquid and can be applied on surfaces using standard coating processes, including dip-coating, spray coating and spin-coating.*
- *Another type of abrasion resistance coating i.e. “Hardcoat UV-100” provides both scratch resistance and UV protection to plastic substrates.*
- *UV radiation at wavelengths below 350nm is cut to almost 100% with the coating, leading to improved weatherability and suppression of discoloration of the substrate.*

✓ *Other Nanomaterials we have:*

- *Carbon Nanotubes*
- *Nanodiamonds*
- *Nanoceramics*
- *Quantum Dots*
- *Nanometals*
- *Fullerenes*
- *Nanowires*
- *Nano and Micro Salts*
- *Tectomers*
- *PEG Derivatives*
- *Phosphonic Acid Derivatives*

Thank you

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