Reinste Nano Ventures Pvt. Ltd.

Designed to deliver the purest…..

Nanotechnology Applications in Energy Sector

About Us

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

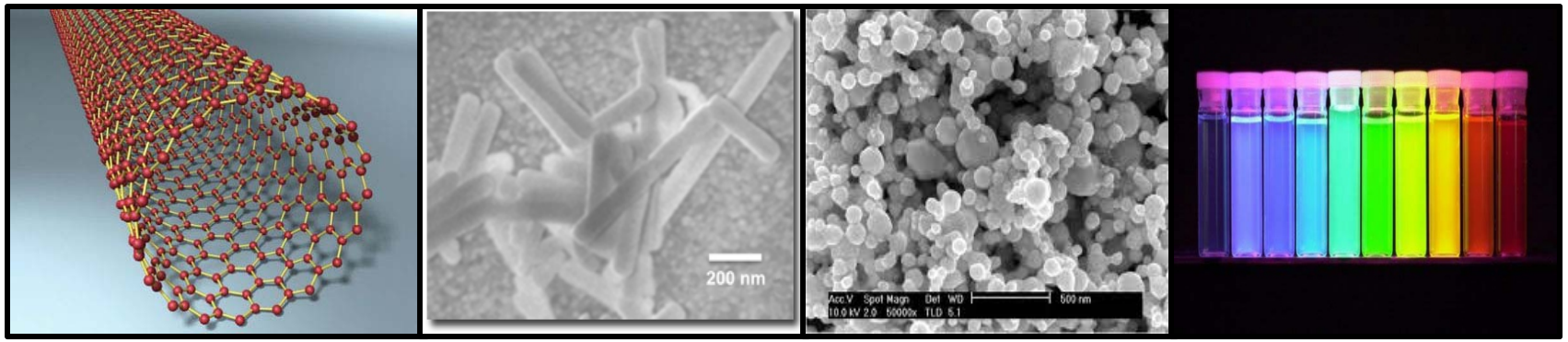
Finest research Grade of nanomaterials

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



Energy Sector

To secure global power supply in the long run, it is not only develop existing energy sources as efficiently and environmentally as possible, but also to minimize energy losses arising during transport from source to end user, to provide and distribute energy for the respective application purpose as flexibly and efficiently as possible and to reduce energy demand in industry and private households.

Energy Supply Chain

1. Regenerative
   a. Photovoltaics
   b. Wind Energy
   c. Geothermal
   d. Hydro Power
   e. Biomass Energy
2. Fossil Fuels
3. Nuclear

1. Gas Turbines
2. Thermo-electrics
3. Fuel Cells
4. Hydrogen Generation
5. Combustion
6. Electrical Motors

1. Power Distribution
2. Heat Transfer

1. Electrical Energy
2. Chemical Energy
3. Thermal Energy

1. Thermal Insulation
2. Air Conditioning
3. Lightweight Construction
4. Industrial Process
5. Lighting

Energy Sector and Nanotechnology

Nanotechnology provides essential improvement potentials for the development of both conventional energy sources (fossil and nuclear fuels) and Renewable energy sources like geothermal energy, sun, wind, water, tides or biomass.

Breakthroughs in nanotechnology open up the possibility of moving beyond our current alternatives for energy supply by introducing technologies that are more efficient, inexpensive, and environmentally sound.

According to the authors, nanotechnologies provide the potential to enhance energy efficiency across all branches ofi ndustry and to economically leverage renewable energy production through new technological solutions and optimized production technologies. Nanotechnology innovations could impact each part of the value-added chain in the energy sector.

Potentials of Nanotechnology in Energy Sector

Nanotechnology has shown the possibility of fulfilling everyone's dream of getting cheap and clean energy through its strategic applications. Its intersection with energy is going to change the way energy was hitherto being generated, stored, transmitted, distributed and managed.

Nanotechnology impact each part of the value-added chain in the energy sector

Energy Sources

Nanotechnologies provide essential improvement potentials for the development of both conventional energy sources (fossil and nuclear fuels) and renewable energy sources like geothermal energy, sun, wind, water, tides or biomass.

Nano-coated, wear resistant drill probes, for example, allow the optimization ofl ifespan and efficiency of systems for the development of oil and natural gas deposits or geothermal energy and thus the saving of costs.

High-duty nanomaterials are very much suitable for lighter and more rugged rotor blades of wind and tidepower plants as well as wear and corrosion protection layers for mechanically stressed components (bearings, gear boxes, etc.).

Nanotechnologies could contribute to the optimization of the layer design and the morphology of organic semiconductor mixtures in component structures. In the long run, the utilization of nanostructures, like quantum dots and wires, could allow for solar cell efficiencies of over 60%.

Energy Conversion

The conversion of primary energy sources into electricity, heat and kinetic energy requires utmost efficiency. Efficiency increases, especially in fossil-fired gas and steam power plants, could help avoid considerable amounts of carbon dioxide emissions

Higher power plant efficiencies, however, require higher operating temperatures and thus heat-resistant turbine materials. Improvements are possible, for example, through nano-scale heat and corrosion protection layers for turbine blades in power plants or aircraft engines to enhance the efficiency through increased operating temperatures or the application ofl ightweight construction materials (e.g. titanium aluminides)

Thermoelectric energy conversion seems to be comparably promising. Nano-structured semiconductors with optimized boundary layer design contribute to increases in efficiency that could pave the way for a broad application in the utilization of waste heat, for example in automobiles, or even of human body heat for portable electronics in textiles.

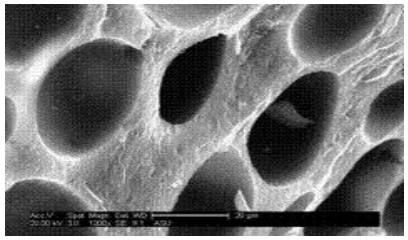
Energy Distribution

Regarding the reduction of energy losses in current transmission, hope exists that the extraordinary electric conductivity of nanomaterials like carbon nanotubes can be utilized for application in electric cables and power lines.

Nanotechnologies could contribute decisively to the realization of distribution vision, through nano-sensory devices and power-electronical components able to cope with the extremely complex control and monitoring of such grids.

Energy Storage

The utilization of nanotechnologies for the enhancement of electrical energy stores like batteries and super-capacitors turns out to be promising. Due to the high cell voltage and the outstanding energy and power density, the lithium-ion technology is regarded as the most promising variant of electrical energy storage.

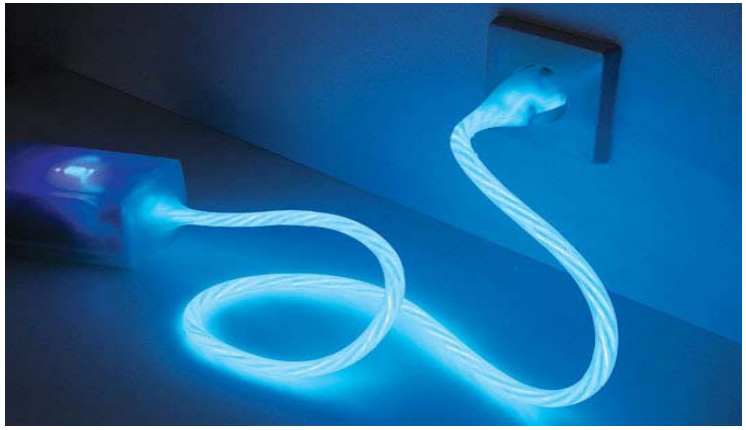


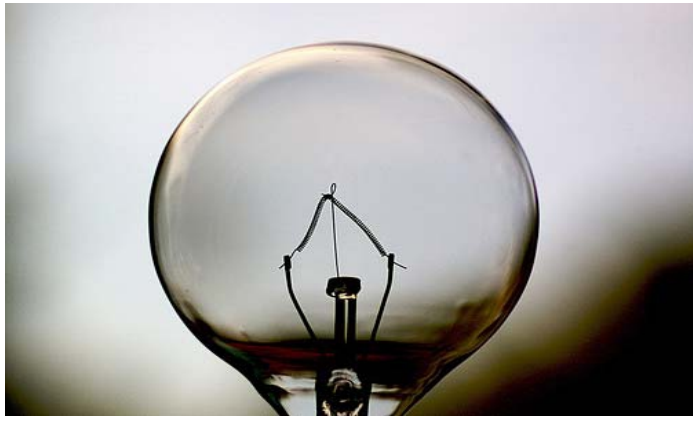
Nanotechnologies can improve capacity and safety ofl ithium-ion batteries decisively

Various nanomaterials, based on nanoporous metal-organic compounds, provide development potentials which seem to be economically realizable at least with regard to the operation of fuel cells in portable electronic devices.

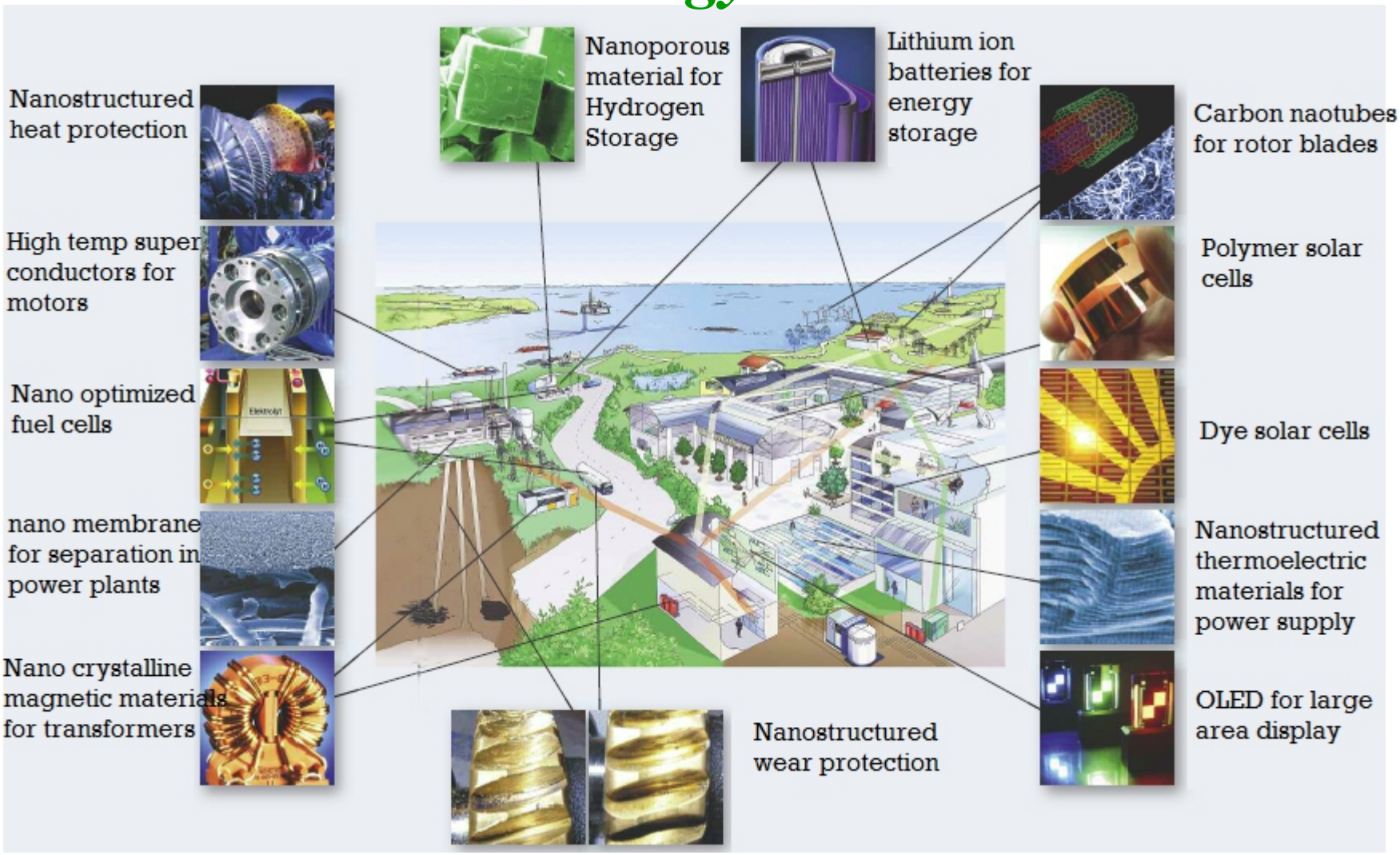
Energy Usage

The reduction of fuel consumption in automobiles through lightweight construction materials on the basis of nanocomposites, the optimization in fuel combustion through wear-resistant, lighter engine components and nanoparticular fuel additives or even nanoparticles for optimized tires with low rolling resistance are some of the examples of nanotechnology development.





Application Possibilities of Nanotechnology in Energy Sector



Total Range of Products We Have

Research Grade & Industrial Grade Nanomaterials

Research Grade Nanomaterials

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

Industrial Grade Nanomaterials

- **NPCC**
- **Nano Graphite**
- **Aluminium Nitride**
- **Silicon Nitride**
- **Silicon Carbide**
- **Titanium Nitride**
- **Zirconium Carbide**
- **Nano Silver**

Non-Oxide Nano Ceramics

Aluminium Nitride

Boron Nitride

Boron Carbide

Gallium Antimonide

Gallium Arsenide

Silicon Carbide

Silicon nitride

Titanium Boride

Titanium Carbide

Titanium Carbonitride

Titanium Nitride

Zirconium Carbide

Titanium Boride - Boron Carbide

Titanium Boride - Boron Carbide - Tungsten Boride

(We can produce nearly any ceramic in nano sized form, thus we are expecting here the concrete wishes from our customers)

Oxide Nano Ceramics

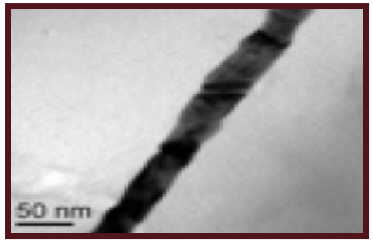
Aluminium oxide(alpha & gamma)
Cerium oxide
Copper oxide
Indium oxide
Iron (II,III) oxide
Iron (III) oxide
Strontium oxide
Tin oxide
Titanium oxide
Zinc oxide
Zirconium oxide
Silicon dioxide
Magnesium Oxide

(Along with the listed NanoCeramics many other ceramics can produced e.g. NanoCeramics from Rare Earth Oxides, HfO_2, $MgO+C$, TiO_2, TiC, TiN, BN, Y_2O_3 .Thus we are expecting here the concrete wishes from our customers.)

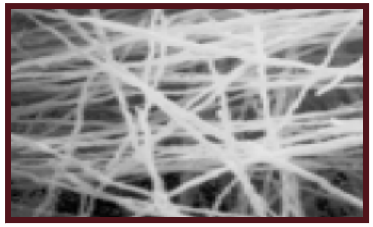
Nano Wires

Cobalt Nanowires

Copper Nanowires



Nickel Nanowires



Silver Nanowires

Lead Nanowires

(Metallic nanowires of different elements can be synthesized. Besides of those present in this catalogue, we can perform custom synthesis of other nanowires like Au, Ni-Co and Ni-Fe of various compositions etc.)

Quantum Dots

CdTe Quantum Dots, powder, hydrophilic
(from 510nm to 780nm emission wavelength)

Easily forms colloidal solutions in water. Terminated with -COOH group.Ideal for labeling purposes. Coupling with -NH2 groups can be achieved through.EDC-mediated esterefication.

CdSe/ZnS (core/shell) Quantum Dots, powder, hydrophobic
(from 530nm to 650nm emission wavelength)

Highly luminescent semiconductor nanocrystals coated with hydrophobic organic molecules. Readily soluble in hexane, heptane, toluene, chloroform, tetrahydrofuran, pyridine. Not soluble in water, alcohols, ethers.

ZnCdSe/ZnS (core/shell)Quantum Dots, powder, hydrophobic
(from 440nm to 480nm emission wavelength)

Highly luminescent semiconductor nanocrystals coated with hydrophobic organic molecules. Readily soluble in hexane, heptane, toluene, chloroform, tetrahydrofuran, pyridine. Not soluble in water, alcohols, ethers.

Coating Materials we have for Energy Sector

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.

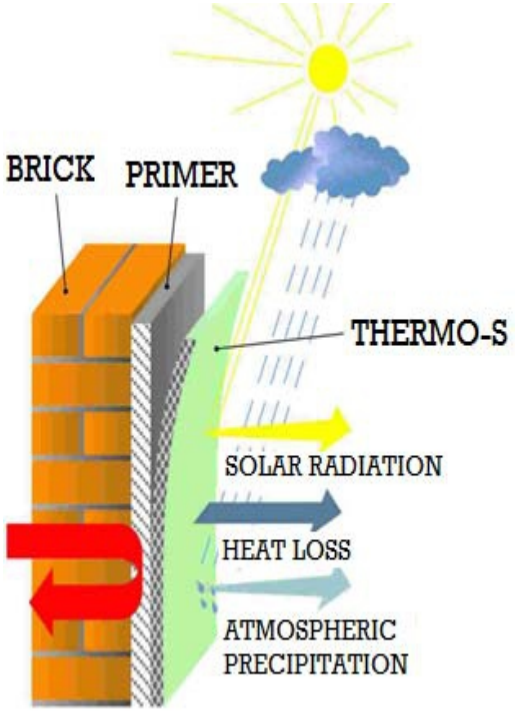
Features excellent repair capability.

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 disolvents 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- healingCoatings

"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.

Thank you

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