





INSIDE NanoVerse

Redefining Nanotechnology through Sustainable Manufacturing.



OUR MISSION

At Resurgen Innovations, we are democratizing access to nanotechnology through responsible, green engineering. Our goal is to make ultra-high-purity metal, metal oxide, and carbon-based nanoparticles affordable for industrial and commercial use by utilizing a revolutionary, solvent-free production process. We believe that true innovation should not come at the cost of the environment.



ROOTED IN INNOVATION: A "MADE IN INDIA" SUCCESS STORY

We take immense pride in our commitment to "Atmanirbhar Bharat"—building a self-reliant nation through cutting-edge science. Our proprietary manufacturing technology is entirely homegrown, developed and perfected right here in India. By reducing dependence on imported materials and foreign technologies, we are strengthening the domestic industrial ecosystem and demonstrating that world-class nanotechnology can be designed, developed, and manufactured locally.



PROCESS EXCELLENCE: CLEAN, SUSTAINABLE, AND PURE

We bridge the gap between laboratory-grade purity and industrial-scale availability. By pioneering an advanced, purely mechanical synthesis process, we have eliminated the need for chemicals and solvents entirely. This chemical-free approach ensures:



Unmatched Purity

Without chemical precursors or solvents, we abate the risk of residual chemical contamination.



True Sustainability

Our production footprint is significantly minimized by excluding hazardous reagents, making our manufacturing process safe for both the environment and our workforce.



Morphological Control

Our proprietary technology allows for precision over particle morphology and size distribution, ensuring consistent performance for high- and applications.



Enhanced Performance

The result is nanomaterials with superior properties, reliability, and application readiness.



EMPOWERING DEEP TECH & EMERGING INDUSTRIES

Our nanoparticles and advanced carbon materials—including Carbon Nanotubes (CNTs), Graphene, and Graphene Nanoplatelets—are driving the next generation of technological breakthroughs:



Semiconductor & Electronics

High-purity materials for minimized, high efficiency electronic components.



Energy Storage

Enhancing energy density, charge-rate capacity, and cycle for modern filmminem and next-gen battery technologies.



Hydrogen Economy:

Advanced catalysts for hydrogen production, storage, and fuel cell efficiency.



Nuclear Technology:

Specialized materials designed for shielding and high-performance structural applications in nuclear engineering.



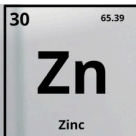
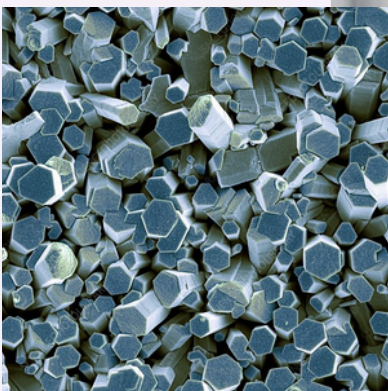
Advanced Magnetics:

Enabling the development of high-strength, high-coercivity magnets for green energy and aerospace applications.



Industrial & Consumer Goods:

High-performance additives for rubber, concrete, ceramics, and specialty raw materials for pharmaceuticals and textiles.



Nano Zinc (Zn)

Nano Zinc Oxide (ZnO)



KEY PROPERTIES

- **Optical & Physical:** Features a wide bandgap (3.37 eV) and high exciton binding energy, making it a highly efficient UV absorber (UVA/UVB).
- **Piezoelectricity:** A non-centrosymmetric structure enables the fabrication of sensitive electromagnetic actuators and sensors.
- **Antimicrobial:** Inhibits microbial growth by penetrating cell walls and generating reactive oxygen species (ROS) via photocatalysis.
- **Biocompatibility:** FDA-recognized as safe (21 CFR 182.8991) at low concentrations.



ELECTRONICS & OPTOELECTRONICS

- **Transparent Thin Film Transistors (TFTs):** Offers high stability and electron mobility; ideal for flexible, lightweight electronics.
- **Piezoelectric & Acoustic Devices:** Enables self-powered nanogenerators (converting vibration to electricity) and Surface Acoustic Wave (SAW) devices for telecommunications.
- **Optoelectronics & Displays:** Drives development of high-performance blue/UV LEDs, laser diodes, and green phosphors.
- **Advanced Sensing:** High surface-to-volume nanostructures provide superior signal transduction for chemical and biosensors.



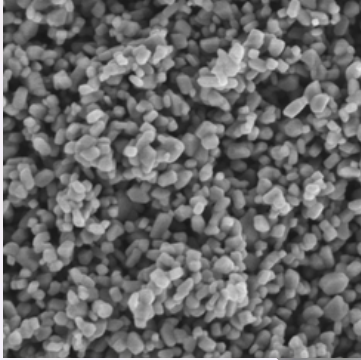
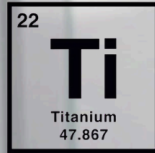
ADDITIONAL INDUSTRY APPLICATIONS

- **Agriculture:** Nanofertilizers improve crop growth, yield, and nutritional value.
- **Healthcare:** Utilized in wound healing, drug-delivery, and viral prophylaxis.
- **Cosmetics:** Provides stable, superior UV-protection in sunscreens.
- **Food Industry:** Applied in active packaging to prevent microbial damage and extend shelf life.



INDUSTRIAL & ENVIRONMENTAL SOLUTIONS

- **Environmental Remediation:** Photocatalytic properties degrade organic pollutants/dyes in water/air and neutralize toxic chemical agents.
- **Energy Storage:** Enhances high-performance capacitors and battery additives; facilitates energy harvesting from ambient mechanical sources.
- **Industrial Catalysis:** High surface area accelerates chemical synthesis rates, serving as a valuable chemical reagent and catalyst support.



Nano Titanium (Ti)

Nano Titanium oxide (TiO₂)



KEY PROPERTIES

- **High Strength-to-Weight Ratio:** Strong as steel but approximately 45% lighter, ideal for weight-critical engineering.
- **Corrosion Resistance:** Forms a stable, protective oxide layer (TiO₂) virtually immune to seawater, chlorides, and acids.
- **Biocompatibility:** Biologically inert, making it ideal for human tissue contact.
- **Thermal Stability:** Maintains mechanical integrity at temperatures up to 600°C.



ELECTRONICS & OPTOELECTRONICS

- **High Refractive Index (n = 2.4):** Scatters light effectively to create intense whiteness and opacity.
- **UV Shielding:** Absorbs UV light, prevents materials from degradation & shielding skin in topical applications.
- **Chemical Stability:** Thermally stable, non-flammable, and chemically inert.
- **Photocatalytic Activity:** Breaking down organic pollutants & facilitating water-splitting reactions under UV light.



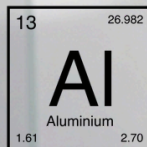
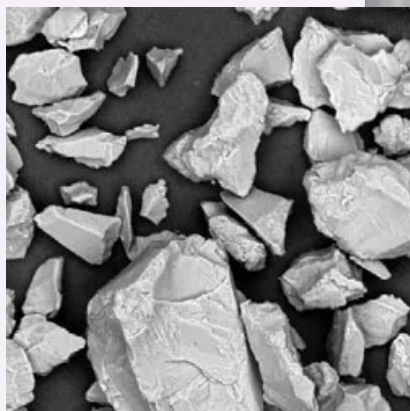
ADDITIONAL INDUSTRY APPLICATIONS

- **Aerospace:** Used for jet engine components, airframes, and landing gear.
- **Medical & Dental:** Essential for implants, surgical instruments, and bone plates.
- **Marine & Energy:** Used in desalination plants and power plant condenser tubes.
- **Hydrogen Tech:** Titanium-based intermetallics are investigated as key materials for hydrogen storage.
- **Semiconductor Manufacturing:** Used in infrastructure requiring high-purity materials for advanced fabrication processes.



INDUSTRIAL & ENVIRONMENTAL SOLUTIONS

- **Dye-Sensitized Solar Cells (DSSC):** TiO₂ structure is critical, providing a high surface area enhances dye absorption & drastically increases light-harvesting.
- **Battery Technology:** Used in energy storage devices improving charge/discharge rates.
- **Hydrogen Production:** Improve visible light absorption and facilitate efficient hydrogen generation.
- **Semiconductors & Sensors:** Utilized in gas-sensing layers for adsorption induces measurable electrical changes, detection of environmental pollutants.
- **Paints, Coatings & Plastics:** Provides opacity, color stability, and UV protection for architectural, automotive, and industrial finishes.



Nano-Aluminium (Al)

Nano-Alumina Oxide (Al₂O₃)



KEY PROPERTIES & INDUSTRIAL APPLICATION

- **Energetic Materials & Rocket Propellants:** Blends with metal oxides bismuth trioxide (Bi₂O₃), iron oxide Fe₂O₃, or copper oxide CuO into nano-thermites that bypass native oxide ignition delays. Reaches combustion speeds up to 1000 m/s with heat output > 3.8 kJ/g, accelerates propellant burn rates by up to 300%, stabilizes combustion, and eliminates nozzle slag.
- **Additive Manufacturing & Metallurgy:** Serves as a reinforcement in Metal Matrix Composites (MMCs) and enables defect-free Laser Powder Bed Fusion (LPBF) 3D printing of aerospace parts.
- **Printed Electronics & Solar:** Replaces expensive silver in conductive inks for flexible circuits, RFID tags, and solar cell back-surface contacts.
- **On-Demand Hydrogen Generation:** Reacts directly with water to generate hydrogen gas and thermal energy without requiring heavy pressure tanks.



KEY PROPERTIES & INDUSTRIAL APPLICATION

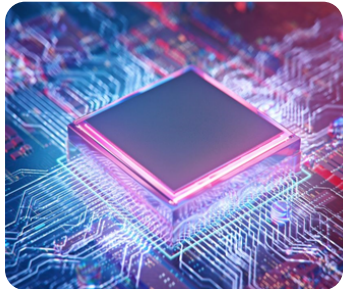
- **Battery Safety & Thermal Management:** Coats EV battery separators to prevent internal short circuits and raise thermal runaway thresholds; acts as an electrically insulating, heat-conducting filler in microprocessor Thermal Interface Materials (TIMs).
- **Abrasives & Hard Coatings:** Primary abrasive in CMP slurries for sub-nanometer wafer polishing; provides transparent scratch resistance in automotive lacquers and industrial flooring.
- **Catalysis & Environmental Filtration:** High-surface substrate for noble metals Platinum, Palladium in chemical refining; powers ceramic membranes to remove heavy metals and oils via electro-adsorption.
- **Structural Ceramics:** Lowers sintering temperatures while producing denser, fracture-resistant body armor plates and furnace linings.

CARBON NANOMATERIALS & TECHNOLOGIES

Product	Dimensionality & Structure	Primary Advantage	Target Applications
Graphene	2D Single-layer planar sheet	High thermal/electrical conductivity, extreme strength	Basic benefits, economical price
Graphene Oxide (GO)	2D Oxygen-functionalized sheet	Water-dispersible, easily functionalized	General health
SWCNTs	1D Single-layer cylinder (~1 nm)	A ~1 nm single-walled carbon nanotube: a rolled graphene cylinder with chirality-dependent electronics and high-capacity ballistic transport.	Stamina & immunity
MWCNTs	1D Multi-layer concentric cylinders	MWCNTs nested graphene cylinders combining superior mechanical stiffness, high chemical/thermal stability, and lower cost than SWCNTs.	Complete nutrition, high quality
Fullerenes	0D Spherical molecular cage	Strong electron acceptor, potent radical scavenger	Organic solar cells, nano-lubricants, antioxidant cosmetics

INDUSTRIAL APPLICATION

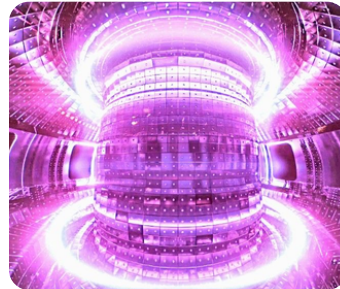
SEMI CONDUCTORS



BATTERIES



NUCLEAR



MAGNETS



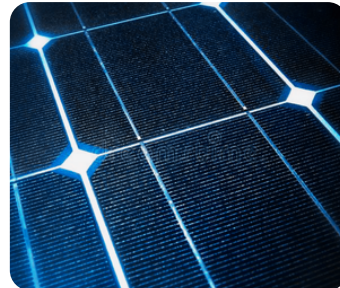
HYDROGEN



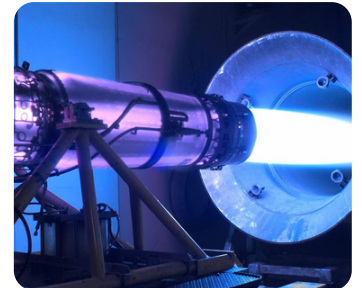
BIO MEDICAL



SOLAR



AEROSPACE



AGRICULTURE



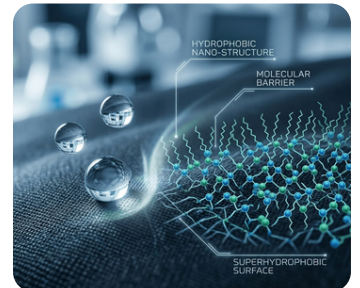
COSMETICS



CONSTRUCTION



TEXTILES



NANOSCALE
PRECISION

HIGH PURITY
& QUALITY

ENHANCED
PERFORMANCE

INNOVATING FOR
THE FUTURE



Resurgen Innovations Pvt. Ltd.

Imagine ✨ Inspire ✨ Innovate

GET IN TOUCH



+91 9377222200



info@resurgeninnovations.com



<https://resurgeninnovations.com>



SCAN TO VISIT OUR WEBSITE



Address: THE CENTRAL, Shed No. 1, Block No. 328, Nr. Hotel Bhagyoday, Sarkhej - Bavla N.H. 8A, Changodar, Tal. Sanand, Ahmedabad, Gujarat, India - 382213

Partner with Us

We offer advanced materials for R&D, high-volume supply chains for production. We combine sustainable, indigenous manufacturing practices with the capacity to help you innovate at scale.