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Commentary

Green nanotechnology and its applications in environmental issues

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DESCRIPRION

Green nanotechnology refers to the use of nanotechnology to improve the natural stability of processes that produce negative foreign substances. It also refers to the use of nanotechnology products to improve sustainability. It involves making raw nano products and using nano-products to support sustainability. Green nanotechnology has been described as the development of clean technology, "reducing the potential environmental and human health risks associated with the production and use of nanotechnology products, and promoting the replacement of existing products with new environmentally friendly nano products throughout their life cycle."

Green nanotechnology has two goals: to produce nanomaterials and products without harming the environment or human health, and to produce nano products that provide solutions to environmental problems. It uses existing principles of chemical raw materials and raw engineering to make nanomaterials and nano products without toxic ingredients, at low temperatures using low-energy and renewable energy inputs where possible, and applying life cycle thinking in all design and engineering phases.

The second goal of Green nanotechnology involves developing products that benefit the environment directly or indirectly. Nanomatadium or products directly can clean up hazardous waste sites, extract salts from the water, treat pollution, or detect and monitor environmental pollution. Indirectly, lightweight nanocomposites for cars and other vehicles can save fuel and reduce the materials used in production; fuel cells powered by nanotechnology and light-emitting diodes (LEDs) can reduce emissions and help save on minerals; excessive nanoscale self-cleaning can reduce or eliminate many of the cleaning chemicals used in conventional repairs, and improved battery life can lead to less material use and less damage. Green Nanotechnology takes a broad view of the nanomaterials and products, ensuring that unintended consequences are minimized and that impacts are expected throughout the entire life cycle.

Application of nanotechnology in environmental issues

Producing less pollution during processing: Another example of this is the way researchers have shown that the use of nanocluster silver as catalysts can significantly reduce the toxicity produced in a system used to produce propylene oxide. Propylene oxide is used to produce common substances such as plastics, paint, detergents and liquid brakes.

The production of solar cells that generate electricity at a competitive price: The researcher has shown that a series of silicon nanowires embedded in polymer results in lower cost but solar cells are more efficient. This, or other efforts using nanotechnology to improve solar cells, may result in solar cells generating as much energy as coal or fuel.

Increasing the electricity generated by windmills: Epoxy-containing carbon nanotubes are used to make air fresheners. The resulting blades are strong and light weight so the amount of electricity generated by each windmill is large.

Cleansing natural chemicals that contaminate groundwater: Researchers have shown that iron nanoparticles can be effective in purifying living solvents that contaminate groundwater. Iron nanoparticles are dispersed throughout the body of water and decompose into a living solvent in the area. This method can be more effective and less expensive than treatments that require water to be thrown down.

Cleaning spilled oil: Using photocatalytic copper tungsten oxide nanoparticles to disperse the oil into perishable compounds. The nanoparticles in the grid provide a high reaction area, absorbed by sunlight and can work in water, making them useful for cleaning oil spills.

Removing volatile organic compounds (VOCs) from the air: Researchers have shown a catalyst that breaks down VOCs at room temperature. The catalyst is made of porous manganese

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oxide in which gold nanoparticles are embedded.

Reducing fuel cell costs: Changing the separation of platinum atoms used in fuel cell increases platinum potency. This allows the fuel cell to work with less than 80% platinum, significantly reducing fuel cell costs.

Hydrogen storage of fuel cell-operated vehicles: Using graphene layers to increase the binding capacity of hydrogen instead of graphene in the fuel tank results in a higher amount of hydrogen storage and a smaller fuel tank. This can help in the construction of hydrogen-fuelled vehicles.