

MagNanoClean™

Nanoscience-Based Fluid Treatment System

“Smart Magnetic Nanotechnology for Efficient Fluid Purification.”

Technology

MagNanoClean™ is an innovative method and apparatus for fluid treatment that leverages charged nanoparticles and a moving magnetic system to remove impurities efficiently and sustainably. In this process, contaminants are trapped by the charged nanoparticles suspended in a reactor. When activated, the magnetic field excites and mobilises only the nanoparticles, which in turn capture and isolate impurities from the fluid.

Unlike traditional filtration systems, MagNanoClean™ operates without moving mechanical parts, significantly reducing energy consumption and maintenance costs. The system's design allows for customisation to specific contaminants or fluid types, offering a flexible, energy-efficient, and low-maintenance solution for water, industrial, or chemical fluid purification.

Market need

The challenge of removing particles after purification inspired the concept of using nanoparticles with a magnetic core. Magnetic nanoparticles have been explored for some time, and various removal techniques have been developed and studied to enhance efficiency. However, existing systems often rely on mechanical excitation methods involving nanoparticles, which results in wear and tear of moving components. This project aims to develop a next-generation prototype that employs a moving electromagnet to manipulate charged nanoparticles within a fluid. Laboratory tests have demonstrated the system's effectiveness in removing specific impurities from water, highlighting the need to scale it up for broader application.



Features

- Nanoparticle-based treatment process designed for efficient purification, separation, or enhancement of fluid properties.
- Magnetically responsive or functionalized nanoparticles enable selective targeting and removal of contaminants.
- Integrated regeneration mechanism allowing repeated reuse of nanoparticles, reducing operational costs and waste.
- Scalable and adaptable system design suitable for industrial, environmental, and laboratory fluid treatment applications.
- Low energy consumption compared to conventional mechanical or chemical treatment methods.
- Environmentally friendly process, minimizing secondary pollution and chemical additive use.



Benefits

- No moving parts, resulting in low maintenance and longer operational life
- Magnetic nanoparticle activation for targeted impurity removal
- Reduced energy requirements through selective excitation of particles
- Highly adaptable system for different fluids and contaminants
- Scalable, compact, and environmentally friendly design



Industry

Water

Possible Applications

- Industrial wastewater and chemical effluent treatment
- Purification of drinking and process water
- Oil and gas fluid separation systems
- Pharmaceutical and bioprocessing applications

Creator

Vijaya VS Vallabhapurapu

Stage of Development

Prototype

Intellectual Property

Patent Protection

Desired Relationship

Co-development investor