

Coolionix™

Nanofluids

“Cool Smarter. Save Energy.”

Technology

This invention presents a novel one-step, open-atmosphere laser ablation process for the mass production of nanofluids. The system enables direct synthesis of nanoparticles from solid targets, including metals, oxides, carbides, and nitrides, into various carrier liquids such as water, engine oil, transmission oil, or ethylene glycol. The process eliminates the need for vacuum systems and complex chemical routes, allowing continuous production of stable nanofluids with high thermal conductivity.

Market need

The global market increasingly demands advanced heat transfer solutions as conventional fluids like water and oils fail to meet the thermal needs of high-power, compact systems in automotive, electronic, and energy sectors. Current nanofluid production methods are expensive, complex, and unstable, which restricts large-scale adoption despite their superior heat conductivity. This invention tackles that challenge by enabling a one-step, open-atmosphere laser ablation process for mass-producing stable nanofluids with up to 200% enhanced thermal conductivity. The technology provides a clean, scalable, and cost-effective method for creating high-performance cooling fluids, satisfying the rising industrial demand for efficient, durable, and energy-saving thermal management materials across emerging sectors such as electric vehicles, power electronics, and renewable energy systems.



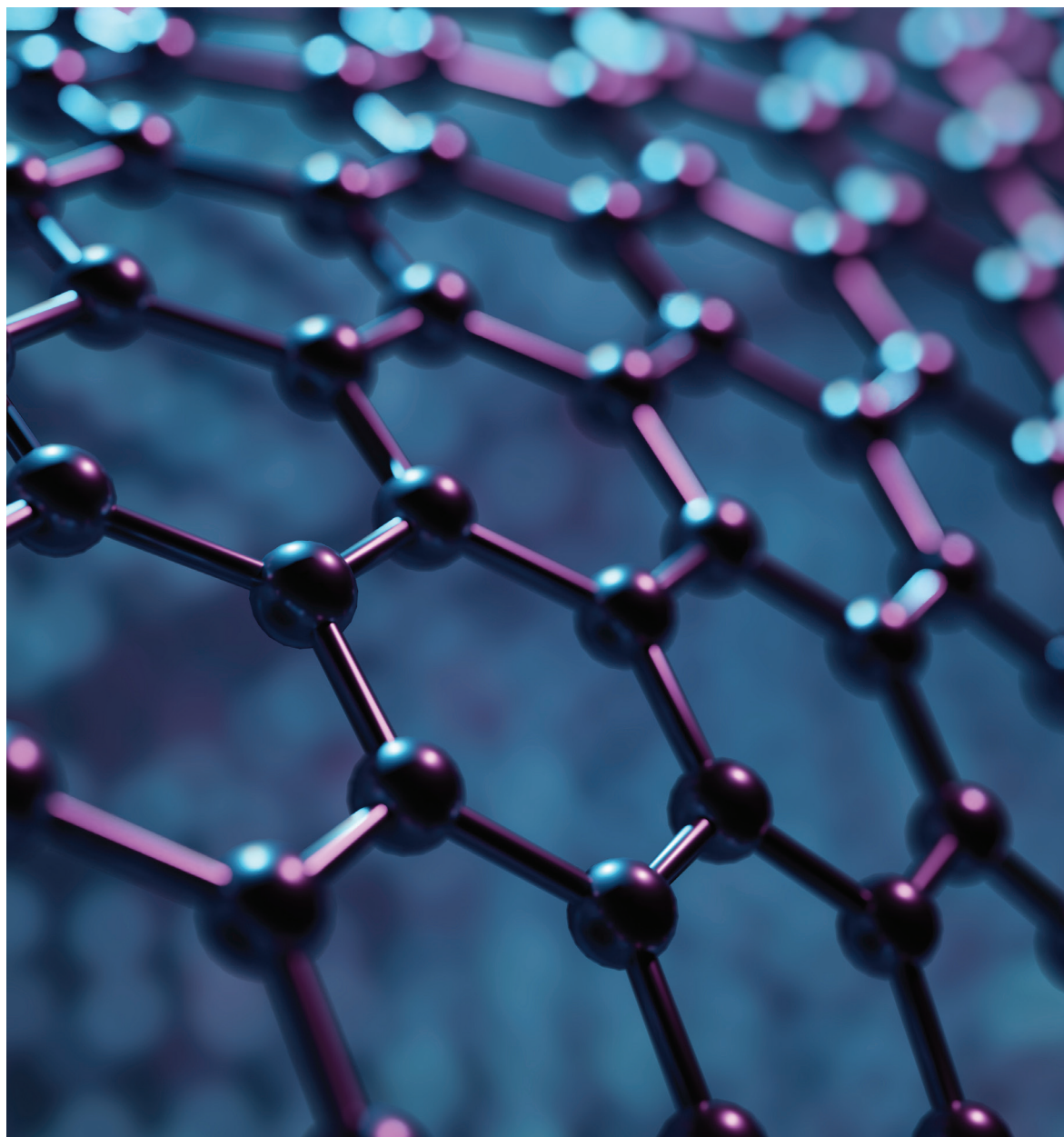
Features

- Produces nanoparticles directly in the host fluid without separate synthesis or dispersing agents.
- Removes the need for vacuum or inert gas environments, reducing system complexity and cost.
- Computer-controlled X–Z displacement and flow regulation ensure consistent ablation and laminar liquid film thickness.
- Applicable to a wide range of target metals (Cu, Al, PGMs), oxides (TiO_2 , Al_2O_3), nitrides (TiN), and carbides (WC, TiC).
- Achieves up to 200% improvement in thermal conductivity compared to pure base fluids.



Benefits

- Enables large-volume manufacturing suitable for commercial applications.
- Nanofluids produced enhance heat transfer in engines, transformers, and electronic cooling systems.
- Reduced maintenance and erosion.
- Integrates with standard laser systems across various power and wavelength ranges.



Industry

Chemical

Potential applications

- Advanced cooling systems for electric vehicles, hybrid engines, and automotive heat exchangers.
- Thermal management in high-power electronics, data centers, and semiconductor devices.
- Renewable energy systems, including concentrated solar power and wind turbine gearboxes, for improved heat transfer efficiency.
- Industrial heat exchangers and process cooling applications requiring enhanced energy efficiency.
- Lubrication enhancement in engines and machinery to improve performance and reduce wear.

Creators

Maalik Maaza

Khamliche Saleh

Stage of development

Lab-scale prototype

Intellectual property

Patent Protection

Desired relationship

Co-development, Investors