

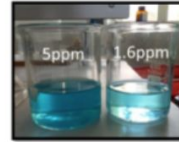
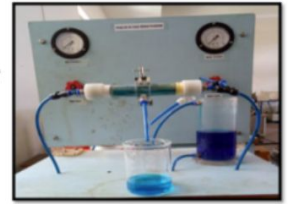
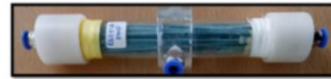
GRANTED

(IN425562)

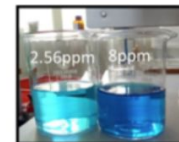
Nanoparticles reinforced hollow fiber membrane

HF Membrane Spinning, Module Preparation and Testing

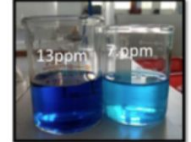
Composition: 18wt% CA + 2wt% rGO in DMF Solvent



t=10 min
68.12%



t=10 min
68.09%



t=10 min
56.61%

NEED

Membrane fouling and breakage cause up to 30% operational downtime and \$1.5B annual maintenance costs in water treatment and bioprocessing industries. Current membranes fail due to weak mechanical strength and poor chemical resistance under harsh conditions, risking product loss and contamination.

TECHNOLOGY OVERVIEW

This invention presents a hollow fiber membrane reinforced with reduced metal oxide nanoparticles. With enhanced mechanical strength, controlled porosity, and high durability, it overcomes traditional membrane failure modes, enabling safer, longer-lasting, and more efficient fluid filtration across industrial, healthcare, and environmental applications.

TECHNOLOGY KEY FEATURES

Reinforced with graphene oxide nanoparticles, enhanced tensile strength, 30%-50% porosity, pore sizes between 0.001 μm to 0.1 μm , durable lumen structure, better fouling resistance, high packing density, adaptable across cellulose acetate and polysulfone bases.

[Read more here](#)

Technology is available for licensing/ co-development.

Reach out to Prof. Deepak Chitkara, Coordinator, BITS Technology Enabling Centre,
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MARKET ANALYSIS

The global hollow fiber membrane market is projected to grow at a CAGR of 8.1%, reaching \$6.5 billion by 2033, driven by rising demand in water treatment, bioprocessing, and industrial separations. [Source: MarketsandMarkets, 2024]

Target Industries

Water Treatment Solutions, Biomedical Filtration Systems, Industrial Separation Technologies, Water purification system manufacturers, membrane module developers, enterprises specializing in bioprocessing and advanced material separations.

AT A GLANCE

- SDG 6 (Clean Water and Sanitation), SDG 9 (Industry, Innovation, and Infrastructure), SDG 12 (Responsible Consumption and Production)